

The information paper sent out by Major Shannon Sentell from the Office of Chief Legislative Liaison, as the U.S. Army response to your Dragon Skin<sup>®</sup> inquiry is yet one more attempt by the Army to use disinformation, misrepresentations and outright lies in its continuing attempt to obfuscate and evade this important issue:

***Why are our frontline troops knowingly issued inferior body armor when demonstrably superior body armor in the form of Dragon Skin<sup>®</sup> has been available for over 10 years.***

The first noticeable element validating this charge is that this "Information Paper" is **NOT** printed on any official Army letterhead, nor is it signed and affirmed by any Army official, military or civilian. Equally conspicuous by its absence is any reference to a responsible Action Officer or Point of Contact (POC) with the standard identifying information and telephone number/email address of the originating official.

Also, please note that not a single reference document is cited. One would, and should, expect that a "Test Report," would be cited as the source for the information presented in this paper.

An anonymous individual has written a document without citing a single source that can be researched to determine the validity of the claims contained therein. Until the author is identified, and the documentation identified that purports to substantiate these charges, this paper cannot be accepted as anything other than just what it is -- another desperate attempt by the Army to defuse the growing controversy about its body armor program.

Notwithstanding the above comments, I have chosen to make a point by point rebuttal of the false and unsubstantiated claims contained in this anonymous and seemingly unofficial paper.

My comments will be made *[[ in blue italics, inside double brackets ]]* within the text of the Information Paper below.

## INFORMATION PAPER

24 October 2006

Subject: Pinnacle Body Armor – SOV/Dragon Skin<sup>™</sup> (Flexible Body Armor)

1. Purpose. To provide information on Pinnacle's SOV/Dragon Skin (Flexible Body Armor).

2. Extensive marketing campaigns and press releases by Pinnacle Armor continue to make remarkable claims regarding their product's level of ballistic protection.

*[[ **This Army claim is false.** As far as extensive marketing campaigns, Pinnacle Armor is **not** conducting **any** marketing. Word of mouth is responsible for the increased media interest, and all of the media approaches have been initiated by the media outlets themselves. The same is true of blogs on the world wide web; they have gathered information and are putting it out without Pinnacle Armor's active involvement. (We do post on our web site detailed information about our product, including video of independent tests conducted by non-DOD agencies. It is the incredible performance of the Pinnacle Armor products as captured in these stunning, sensational videos clips that has attracted interest on the part of those who are continuing to validate on film Dragon Skin's<sup>®</sup> unequalled performance capabilities. ]]*

The claims directly compare Dragon Skin to the Army's Interceptor Body Armor (IBA) with the assertion that IBA is inferior. The Army has test data that conclusively demonstrates that Dragon Skin does not meet the Army requirement for Soldier Body Armor protection.

*[[ **This Army claim is false.** The Army has test data, including ballistic data it has classified "SECRET," and non-classified ballistic data that proves Dragon Skin is in fact superior in every way to Interceptor. The data that is non-classified is available at Pinnacle Armor for review by anyone who wishes to see it. I will also make available the specifications on Individual Body Armor (IBA), Small Arms Protective Inserts (SAPI) and Enhanced Small Arms Inserts (ESAPI). The new reader must keep in mind that the Outer Tactical Vest component of the IBA is the all textile garment that protects only against handgun and light fragments in which the level 3 SAPI and level 4 ESAPI plates are carried in pouches designed for that purpose.]]*

3. During the period 16–19 May 2006, Project Manager, Soldier Equipment (PM SEQ) conducted testing of Pinnacle Armor's SOV 3000™ Body Armor Vest (Dragon Skin) at H. P. White laboratory in Street, MD. HP White is a National Institute of Justice certified ballistics laboratory used to test Army Body Armor.

*[[ **This Army statement is incorrect.** The actual test dates were 17-19 May 2006 with the testing being terminated by Col. John Norwood at 1400 hours on Friday May 19th. The reasons stated were presented by the test director for the Interceptor Program, Karl Masters. His statement was "**I'm completely baffled by this flexible technology and I'm not going to send another round down range until I can understand how a flexible system works**"! (This statement, and others cited below, were captured on audiovisual media that was operated by the Army. The media records are held by the Army.)]]*

4. Testing was conducted using the Enhanced Small Arms Protective Insert (ESAPI) First Article Test (FAT) protocols to insure the item meets Army

requirements for ballistic protection. Prior to fielding, all ESAPI designs must pass a robust FAT protocol under a variety of environmental conditions including high (+160<sup>0</sup> F) and low (-60<sup>0</sup> F) temperature, diesel fuel, oil, saltwater immersion and a 14 hour temperature cycle from -25<sup>0</sup> F to +120<sup>0</sup> F.

***[[Paragraph 4 (the introductory paragraph) is false. The testing was represented to Pinnacle Armor and all other parties to be a First Article Test (FAT) based upon the ESAPI test protocol and procedures. From the first test round fired it was evident the Army had another agenda, as they deviated from the edge distance protocol in a vain attempt to fail the system. It continued until the last medium body armor unit was shot 12 times with M2AP 7.62x63mm armor piercing ammunition without failure. And, significantly, the back-face trauma that is normally averaged at 46 to 48mm on the ESAPI plates, turned out to be only 18mm for the Dragon Skin vests (averaged over all shots). That is a 61% to 63% reduction in back-face signature/deformation that has never been achieved in any previous test of a Level IV body armor system.]]***

- a. Pinnacle SOV 3000 level IV Dragon Skin vests suffered 13 first or second shot complete penetrations, failing 4 of 8 initial subtests when tested with ESAPI threat baseline Armor Piercing (AP) ammunition.

***[[The Army claims in paragraph 4a are false. The Dragon Skin<sup>®</sup> body armor system never failed a valid FAT first shot penetration. The only first shot penetration was the very first round fired of the entire test on the first day, which was .50" inches from the edge. The ESAPI FAT protocol calls for a minimum of .75" to 1.25" distance from the edge as the closest dimension to any edge. Anything closer is considered an invalid shot. That shot was determined by the test director Karl Masters as an invalid shot subsequent to his inspection. (This is one of the 8 penetrations claimed.)***

***Dr. James Zheng from NATICK laboratories was conducting all of the shots against the Dragon Skin<sup>®</sup> body armor system. Both he and Karl Masters subsequent to that went into a two hour meeting to try to establish an agreement of what defined a "hard edge" of the armor system. When the testing resumed there were a total of 4 second shot complete penetrations that were deemed to fall within the ESAPI Q/A retest protocol and therefore would not be considered failures. There was never any retesting of those 4 shots as is required by the Army's own FAT Q/A protocol. (These four shots, plus the one in the preceding paragraph, make a total of 5 shots of the claimed 8 "penetrations now rebutted.)***

***The other so-called 8 failures are directly attributed to James Zheng directing shots into areas of the vest where there was not any Dragon Skin<sup>®</sup> rifle defeating composite armor! These 8 shots were into the soft aramid textile part of the vest (commonly called Kevlar), which is -- again -- specified to protect against only handgun rounds and small, low-velocity fragments/shrapnel. (This is true for the aramid parts of both Dragon Skin<sup>®</sup>***

*and IBA.) The test director, Karl Masters, and James Zheng after those shots were determined to not be valid shots entered into a substantial, heated argument over who was in charge of the testing, and over the indiscriminate 8 shots that did not impact the Dragon Skin<sup>®</sup> rifle defeating composite armor. At that point Karl Masters threw down his clipboard and paperwork and stormed out of the range as he told James Zheng "You represent the government, you select the shots and you will be responsible" Again, the audiovisual records held by the Army will confirm this conversation. (All 8 shots that the Army falsely claimed as penetrations have now been rebutted.) ]]*

b. A physical configuration inspection of the Pinnacle Armor SOV 3000 test items revealed that the SOV 3000 level IV Dragon Skin system has an area density of 12.53 pounds per square foot (psf) and IBA is 8.05 psf. This equates to Dragon Skin being 55.65% heavier for the same area coverage.

*[[The Army claim in Paragraph 4b is false. The Army purchased three sizes of vests for the FAT testing: Medium, Large, and X-Large. For each size, the Army ordered the maximum full- torso wrap, rifle-defeating-coverage configurations.*

*The size Medium has a total of 3.40 square feet of rifle defeating coverage and weighed in at 33.15 pounds. The weight per area (with ballistic protection) in this size/configuration is 9.75 pounds per square foot.*

*The size Large has a total of 4.05 square feet of rifle defeating coverage and weighed in at 40.96 pounds. The weight per area (with ballistic protection) in this size/configuration is 10.12 pounds per square foot.*

*The size X-Large has a total of 4.40 square feet of rifle defeating coverage and weighed in at 46.13 pounds. The weight per area (with ballistic protection) in this size/configuration is 10.48 pounds per square foot.*

*The difference among the total weights for the three sizes of Dragon Skin is because the weights were based on the weight of the whole vest, not just the armor panels without the carrier as the Army base their weight comparisons on. The larger the vest the more carrier and webbing material that is used, adding to the weight but not to the ballistic protection.*

*The Army is comparing the size Medium Interceptor OTV with two 10"x12" inch plates and two 6"x7" inch side plates, with a total square footage of 2.25 square feet of rifle-defeating (ballistic) coverage, and a weight of 31.1 pounds (according to Army and Marine Corps Systems Command data). The weight per area (with ballistic protection) in this size/configuration Interceptor vest is 13.82 pounds per square foot.*

Therefore, comparing a size Medium Dragon Skin with a size Medium Interceptor:

	<u>Medium Dragon Skin</u>	<u>Medium Interceptor</u>
Weight (pounds)	33.15	33.10
Protected area (sq.ft.)	3.40	2.25
Weight (pounds) per Protected area (sq.ft.)	<b>9.75</b>	<b>13.82</b>

The result -- a size **Medium Interceptor** with a front and back plate, and two side plates is **41.7% heavier** than a size **Medium Dragon Skin** in the full-torso wrap, rifle-defeating configuration. ]]

c. Pinnacle SOV 3000 level IV Dragon Skin suffered catastrophic failure of the ceramic disc containment grid adhesive at -60° F, 120° F and 160° F.

[[ The Army claim in Paragraph 4c is false. The Dragon Skin® body armor system was tested at four FAT temperature settings of -60° F, +120° F, +160° F and +250° F.

*The cyclic temperature shock test involved both a low temperature -25° F and a high temperature +120° F rotation of 2 hours each, over a 24 hour period of time. The vest was then immediately shot.*

*The temperature extreme verification which consists of a -60° F conditioning for 6 hours time, then immediately shot; and a +160° F conditioning for 6 hours time, then immediately shot.*

*The flammability test which consists of a +250° F conditioning for 15 minutes to ensure that the armor does not drip, melt, combust or explode.*

*Dragon Skin never failed any one of these four tests.*

*One vest was tested under the environmental test condition of -60° F for 6 hours, then shot with 12 armor piercing rounds. That means that the vest is also not allowed to be exposed for more than 30 minutes before being restored to the -60° F temperature to continue the testing, to maintain the cold temperature effect on the armor system. The test was terminated after that last shot before the entire FAT testing protocol and procedures was complete, as described in paragraph 3.*

*There was one anomaly when a vest was heated for 6 hours at +160° (F) and suffered an adhesion failure on **one row** of discs. This was determined to be the result of a missing strip of adhesive approximately 25mm in width on that one row of discs, which resulted from a malfunction (skip) in the laminating process which involves a machine heating and applying the adhesive to the textile sandwich holding the discs. This*

*malfunction was corrected by the sub-contractor (the "laminator" of the adhesive) who implemented a new overlapping process that added a small overlap to each point where new adhesive strips were introduced into the laminating machine. This sub-contractor also added an inspection item on this issue to his QA process as a result of this anomaly. (Pinnacle Armor likewise modified its QA process to include an inspection specifically for this issue.) The test director Karl Masters called it an anomaly as the other temperature tests at -60 degrees (F), +120 degrees (F) and at +250 degrees (F) did not fail. (No shots were fired at the vest that suffered the anomaly at +160 degrees (F), except those that James Zheng had shot into the areas without the discs.) ]]*

d. SOV 3000 design is sensitive to extreme temperatures and failed to maintain ballistic integrity at temperatures below summer ambient in Iraq and Afghanistan. This failure mode caused discs to delaminate and accumulate in the lower portion of the armor panel, and thus would expose the spine, vital organs, and critical blood vessels of the Soldier in these operational environments.

*[[ The Army claim in Paragraph 4d is false. The above explanation for Paragraph 4c also applies here.*

*Additionally, Pinnacle Armor subjected three vests to tests for six hours at +170 degrees (F) and +180 degrees -- 10 and 20 degrees higher than the FAT protocol temperature -- at the Army Test Center, after the Army terminated the May FAT testing at H. P. White Laboratory. Later, Dr. Gary Roberts conducted an independent test October 3, 2006 at +170 degrees (F) for 12 hours -- twice as long as the six hours and 10 degrees higher than called for in the FAT protocol -- without any ballistic failures or adhesion failures, further validating that the one anomaly at +160 degrees (F) was just that - an anomaly and not a design or material failure. (It is also notable the Army did not re-test this issue, as is required by the Army's own FAT Q/A protocol.) (All 13 shots that the Army falsely claimed as penetrations have now been rebutted.) ]]*

5. The Army did not complete the entire ESAPI test because the Dragon Skin system failed numerous portions of the test protocol. All manufacturers must pass 100% of the ESAPI and ESBI FAT tests before their product is certified for Soldier use.

*[[ The Army claim in Paragraph 5 is false. The Army terminated the test as per the answer to paragraph 3. We were given some additional insight by Col. John Norwood just before we were to depart the testing facility. He said that we did not fail the ballistic test just the specifications. When asked which ones we were told the weight and rigid requirements. That rigid requirement of a plate vs. a flexible panel system.*

*The fact that we submitted a flexible system as ordered on the Army purchasing document did not seem to matter to him. It was the Army's decision to test a flexible system, Dragon Skin, using the FAT protocol for the Interceptor's rigid plate system. Additionally, the fact that the Army purchase order also requested a complete torso wrap for each of the sizes, did not seem to matter to him. The current specification requires weights based upon what the current plates with the Interceptor OTV weighed, meaning that although the Dragon Skin Medium SOV-3000 weighed only 0.05 pounds more than the Interceptor Medium and provided substantially more ballistic protection, the fact that the Dragon Skin was even a fraction of a pound heavier was seen by the Army as failure to meet the weight requirement. I explained to him that if those were his reasons for us failing (specifications) then we do not ever intend to meet them. Brigadier General James Moran, in charge of PEO-SOLDIER had ordered a flexible body armor solution with complete full torso coverage in the contract purchasing the Dragon Skin vests for the test. Such specious reasons for "failure" were clearly not warranted.]]*

Attached as a separate document is a Pinnacle Armor Fact Sheet that defines ten milestones that the Dragon Skin<sup>®</sup> body armor has established within the body armor industry. These ten listed elements have been proven as performance capabilities of the Dragon Skin<sup>®</sup> body armor system. These performance capabilities have never been developed in any armor system before, let alone all together at once.

**"Pinnacle Armor Fact Sheet"**

The following ten benchmarks have never been achieved by any armor system ever developed by the military for body armor. These have been established and verified by the U.S. Army Research Laboratory in Aberdeen Maryland., as the elements that make the Dragon Skin<sup>®</sup> body armor system, a two generation advancement in body armor.

1. **Lower weights.** The lower weights for the ballistic performance capabilities of the Dragon Skin<sup>®</sup> body armor system are be greater than the current “state-of-the-art” system, primarily in the projectile velocity capabilities. A typical 10”x12” flexible level 3 panel weighs only 4.95 pounds. On a per square foot basis, there is not a body armor system that can meet the performance capabilities of this system.
2. **Flexibility.** The Dragon Skin<sup>®</sup> body armor system has increased flexibility to increase the soldier’s capability to perform his/her function. With increased flexibility the soldier will expend less energy and less energy expended in a flexible system vs. a rigid system means less BTU’s and thus a cooler deployed system. The Dragon Skin<sup>®</sup> body armor system can literally be wrapped around a basketball.
3. **Durability.** The durability of the Dragon Skin<sup>®</sup> body armor system is substantially increased over the monolithic plate system as the plate system is subject to numerous design flaws that render it extremely prone to damage resulting in a degradation of ballistic defeating performance capabilities. This also precludes the plate system as being capable of meeting the recapitalization of the future military requirements for equipment life cycles.
4. **Greater coverage.** The system has the ability to cover/protect larger areas, if not complete torso coverage, without loss of ballistic performance, without ballistic gaps or ballistically degraded joints in the coverage or loss of the capability for the soldier to perform his/her function. This allows for mission specific designs that cannot be designed with the monolithic plates, such as concealed rifle defeating body armor.
5. **Less Trauma.** The system aids in mitigating blunt trauma to the users body as much as possible, and where possible, reduce it below that of the current “state-of-the-art” system from 52% to 54%, while maintaining the greater performance factors of the new system. Soldiers and contractors who have been shot with the Dragon Skin<sup>®</sup> body armor system have said that they did not even bruise.
6. **Better edge hit capability.** The Dragon Skin<sup>®</sup> body armor system is able to have a greater or closer edge point of impact capability. Current test protocols and procedures are not appropriate for the real world applications where exact spacing and locating of the projectile impact points are manipulated. The enemy does not shoot at you with precision placed shots according to a protocol and procedure.

7. **Increase multiple repeat hit capability.** The Dragon Skin<sup>®</sup> body armor system will out perform any current system, as the likelihood of a soldier in an urban environment sustaining a greater number of hits is enhanced. Soldier survivability is of prime importance, especially when the military is a voluntary one, and every man trained becomes more valuable. The system is capable of defeating 2” round to round spacing throughout the armor with a 97% level of confidence in each shot, compared to the estimated 63% to 67% of the current military production SAPI and ESAPI plates. That equates to the capability of a 1,500 % improvement over the current system.

8. **Increased projectile diversity resistance.** The Dragon Skin<sup>®</sup> enhanced level 3 body armor system meets the compendium of projectile threat types from the various associated caliber munitions currently encountered within regions of Department of Defense deployments including the 7.62x39mm armor piercing incendiary (API) projectiles. Real world armor designs should encompass all currently known to be deployed projectile types by caliber within the theater of deployment as directly related to the level of armor protection. The current military systems can only defeat a few threats within each specific level of performance, instead of all currently manufactured military ammunition worldwide that our soldiers could face.

9. **Functional form & fit flexibility of the system.** The Dragon Skin<sup>®</sup> body armor system meets the demand requirements of the military for gender considerations where applicable. Primarily male fit constraints and secondary female fit constraints need to be removed and made practical. Not all gender anatomic deviations can be designed as a “five sizes fits all” requirement. Rigid monolithic systems do not even consider male deviations such as barrel chested males which cannot get the plate to lay flat against the body causing an oversized thickness in the chest region which in turn precludes and/or restricts movement across the chest, or wide flat backed individuals where the plates are too narrow in width to prevent the curved corner edges from digging into the back nor even allow for injury deformations incurred during battle, or for prolonged deployment where the armor must be worn over such injuries, let alone female breast cup and chest size variations. The flexible Dragon Skin<sup>®</sup> body armor system allows for each of these variables and form & fit considerations for the 97% percentile of both men and women.

This is the first time that a body armor system has been developed that meets the military requirements for an armor system capable of being designed as mission specific for any branch of the Department of Defense and any mission profile.

10. **Reduced ricochet.** The Dragon Skin<sup>®</sup> body armor system does not allow for any ricochet of the projectile until you reach a 60° degree angle of obliquity. This is substantial in reducing collateral injuries or fatalities for those near or next to the wearer should a projectile impact at a high obliquity and ricochet into them. Current systems enhance ricochets at approximately 32° degrees angle of obliquity. The Dragon Skin<sup>®</sup> system, due to its flexibility and individualized disc imbricated layout configuration, actually precludes this until the obliquity is increased to where the ogive of the bullet instead of the metplat (point) impacts the armor. Then, the obliquity is too great of an angle for encapsulation within any rifle defeating armor system.