

Aerovation Checkpoint Friendly Laptop Bags

August 16, 2009 marks the one year anniversary of the Transportation Security Administration's (TSA) announcement that all security screeners have been trained to allow checkpoint friendly laptop bags. Since that time, dozens of manufacturers have brought checkpoint friendly laptop bags to the market. The Aerovation CPF® checkpoint friendly laptop bag was the first on the market and remains the easiest to use and fastest to screen of all the designs. This paper will explain how the checkpoint friendly program is doing and how Aerovation remains the leader in this market.

When TSA first asked industry to design a checkpoint friendly laptop bag in early March 2008 they specified¹;

1. *The bag and laptop can be viewed by the TSO in a single x-ray image (i.e., the laptop bag in scanning configuration would not exceed any one of the following dimension, 16in. H by 24in. W by 36in. L whereby the laptop will not need to be placed in a separate TSA bin.)*
2. *The bag allows for effective x-ray visualization and screening of the laptop by ensuring the following in its design:*
 - a. *Transmission x-ray Image quality attainable by current TSA x-ray equipment shall not be degraded by the materials used in the bag design as measured in accordance with American Society of Testing and Materials (ASTM) F792-01 standard.*
 - b. *The laptop image is clear and distinguishable from the bag (i.e., there can be no straps, pockets, zippers, handles, closures that interfere with the image of the laptop); and*
 - c. *The laptop image is not shielded by the contents of the bag (i.e., there can be no electronics, chargers, battery, stationary, wires, paper products and pens that interfere with the image of the laptop).*
3. *The bag has distinguishing, self-evident features that allow the TSO to identify that the laptop does not need to be removed from the bag. These features would include the physical design characteristics of the bag itself and not symbols or labeling.*
4. *Minimize the possibility that laptops could be damaged during the screening process or during normal handling.*

The most important criteria in this specification is the requirement for the laptop bag to be x-ray transparent and the one most misunderstood by bag manufacturers. Nowhere in this specification nor in later documents issued by TSA is there a requirement for the contents of the laptop bag to be made visible to the naked eye. x-ray transparency does not require visual transparency and visual transparency does not guarantee x-ray transparency. The engineers at Aerovation coming from a rich background in stealth design ranging from microwave to infrared to x-ray. They understood this requirement more than the typical luggage maker. While other manufacturers were modifying their existing production with vinyl windows, mesh screens and open trays, Aerovation was developing a laptop compartment with liners, padding and exterior structures that were very x-ray permeable and inorganic so as not to trigger false positives for contraband during the x-ray scan. Rather than guess,

¹ Solicitation Number : HSTS04-08-RFI-MC Agency: Department of Homeland Security Office: Transportation Security Administration Location: Headquarters TSA 3 March 2008.

Aerovation used actual x-ray scanners used by TSA including those with the capability of detecting organic compounds used in bomb-making. In April of 2008 the first prototypes were scanned at a TSA checkpoint where the supervising inspector commented that "This laptop appears as if it were in a bin by itself" a phrase later used by TSA in conferences with the vendor base to describe the standard for performance. In fact, the laptop computer appears more clearly in an Aerovation CPF® bag than the bin because the Nylon exteriors, foam padding and polyester liners of the Aerovation CPF® bag are far more x-ray transparent than the standard bins used by TSA.

Having reached a level of x-ray transparency unimagined by even the TSA, Aerovation didn't stop. Without changing this most important design requirement Aerovation set out to make the bag easy to use and fast to screen by monitoring the screening process to see the bottlenecks and actually measuring the processes. They learned that it was the end of the screening process that created the biggest bottleneck for the laptop user. The roller conveyor at the end of the belt is tilted down so that bins, bags and other cleared property runs quickly away from the tunnel only to land in a pile at the bottom. If the laptop computer was in an open compartment it stood a good chance of dislodging or worse. Therefore, it was important that the laptop bag contain the laptop computer during the race down the conveyor and be protected with padding on all sides and edges to prevent damage from other articles falling on it. However, the best way to protect the laptop computer from getting rammed by other people's luggage was to get it off the belt before it got hit. This meant that the user should be able to pick the bag off the conveyor without having to post process it on the belt. Post processing would be folding up the bag, zipping the bag back together, restoring a sleeve or sliding a tray back into a collapsed slot in the bag. A means of restoring the bag to the carry configuration had to be automatic.

So, Aerovation invented the top hinge, self-restoring checkpoint friendly laptop bag. The Aerovation CPF® line of laptop bags all work the same way. There are two main sections or compartments depending on the size of the bag. One compartment tilts away from the other at the top to lay flat on the x-ray scanning belt. This compartment is held in place by gravity and Velcro™ so the user doesn't have to unzip or unbuckle anything to configure the bag for inspection. Once, the bag is "flattened" the user can remove their shoes and proceed through the metal detectors. After the x-ray inspection the user grabs their shoes and with their free hand picks up the Aerovation CPF® bag from the belt. The bag restores itself to the carry configuration. This method of flattening a bag and isolating the laptop computer whether top hinged or bottom hinged was submitted for patent by Aerovation within a week after the requirement was published by TSA.

TSA received over 3 dozen prototype bags from vendors in the 3 months after their announcement. According to Kip Hawley, the TSA Administrator, they were all deemed "satisfactory." This was as much a political statement as a technical assessment because TSA decided they were not going to approve a design or publish a specification. By declaring all the players "satisfactory" TSA left the court as referee and told industry that they would have to self-certify and that the ultimate test would be the consumer who would have to deal with the consequences of a design that didn't create a clear and unobstructed view of the laptop computer in the x-ray tunnel. At this industry meeting, TSA announced they would allow checkpoint friendly laptop bags at all TSA checkpoint and be ready "by the time industry has them on the market."

Mr. Hawley and the TSA washed their hands of any design specifications and more particularly judging the suitability of one design over another for the task at hand. This, understandably, upset most of the vendors who weren't willing to risk designing a bag that may fail at the checkpoint. Aerovation was not deterred by TSA's unwillingness to endorse a particular design. They went into full production of the top hinged bag well before TSA's backing off on certification. Aerovation was delivering fully compliant checkpoint friendly laptop bags to paying customers in the first week of June 2008. When administrator Hawley heard that his organization was not, in fact, ready "by the time industry has them on the market" he directed that the TSA move their training up by almost 2 months. There was only one vendor selling bags in the summer of 2008 and it was Aerovation Products.

Initially, TSA had a few press releases and announcements. Industry was promised a "media blitz" but it never happened. Instead TSA sent artwork for each checkpoint to print as shown.

TSA categorized the various designs into 4 main groups as shown in Figure 1 that is posted at every TSA checkpoint in the system.

The tray style of checkpoint friendly laptop bag (Figure 2) has several variations divided in soft trays or hard trays. The intent of these bags is to replicate the gray bin at checkpoints. This system gives a clear and unobstructed view of the laptop but has several drawbacks. Namely, it requires you to unzip the bag, orient the bag so that the tray comes out adjacent to the bag and pull the tray out. In order to keep the tray from pulling all the way out most tray style bags tether the tray to the rest of the bag with a flap or strap. Once, the bag has cleared the



Figure 2

Can Your Laptop Stay In?

Laptops need to be removed from bags and placed in the bin **unless** your bag meets new "**checkpoint friendly**" guidelines.

What makes a bag checkpoint friendly:

- A single or separate compartment just for the laptop with **nothing on top or under it**
- The laptop is the only thing in the separate compartment

Examples:

TRAY STYLE BUTTERFLY STYLE

TRI-FOLD STYLE SLEEVE STYLE

Your safety is our priority

Transportation Security Administration

For more tips on checkpoint friendly bags, log onto www.tsa.gov

Figure 1

x-ray tunnel the user slides the tray and its contents back into the bag and closes the zippered pocket. Since the tray has to lay flat on the scanning belt the compartment for the tray has to be on the bottom. This means that anything else in the bag will tend to collapse the cavity making insertion difficult. All of the tray style bags have either a mesh cover or nothing at

all to keep the laptop in the tray during scanning. If the user picks up the bag or it gets jostled in the line during the slide down the conveyor the laptop could fall out of the tray. One manufacturer has a rigid tray with complex grippers to hold the laptop to the tray to prevent this from happening. However, this system is limited to a small number of laptop computers sized to fit in the notches. Due to the complexity of tray style bags they tend to be expensive and with all those moving parts could see some maintenance problems.



Figure 3

The tri-fold style of checkpoint friendly laptop bags is popular with the more expensive lines of products because it's more difficult to create all those pockets to handle your stuff. These bags typically have the laptop compartment sandwiched between two accessory compartments. In order to present a clear x-ray view of the laptop this compartment has to be unfastened from its nest and laid out onto the scanning belt. Although, this style of bag does a great job of protecting your laptop deep inside the bag during normal use they require an extreme amount of

effort to disassemble and reassemble in the checkpoint. In order to restore this style of bag to the carry configuration the user has to unfold the bag, fold the laptop compartment into the gap and feed the handle through a slot between the outer bags to bring the two handles back together. There are also several buckles to snap during this process. Picking this bag up with one hand is impossible at the bottom of the conveyor. This bag takes a long time to prep and recover.



Figure 4

The sleeve style of checkpoint friendly laptop bag (Figure 4) is the simplest of all of the designs and usually consists of a neoprene sleeve that snugly encases the laptop. Some have a handle but by definition this style of bag has no provision for accessories, files or other travel items. Therefore, they generally are retrofits to existing non-compliant bags so the user can lay their laptop directly on the

belt. This style of laptop bag has no speed advantage over the gray bin and losing your laptop is possible since you have separated it from your laptop bag. 1200 laptop computers are lost at TSA checkpoints every week many of them inside sleeves.

The butterfly style of checkpoint friendly laptop bag is by far the most popular design on the market. There are two styles in common use; the bottom hinged style (Figure 5) and the top hinged style (Figure 6). The bottom hinge design is the most common because it's



Figure 5

the closest to non checkpoint friendly laptop bags. The manufacturers of these bags generally modified their existing designs to open like a clamshell with the laptop computer on one side and accessories on the other. In order to make a bottom hinge bag work you have to unzip the bag through all three sides either with two zipper pulls or in rare cases with a single long zipper and lay the bag flat on the belt. Some designs leave the laptop exposed completely (Figure 5) laying on the belt and some encase the laptop completely (Figure 7). Most have the laptop at least partially exposed with a vinyl or mesh window. When the user reaches the bottom of the conveyor they usually need to find two handles and bring the halves back together manually or grab the shoulder strap which draws the two halves together automatically. In either case a bottom hinged bag requires the user to secure the two halves together at the end of the process. This activity will require both hands at a point in the line where spare hands are at a premium.

The other style of butterfly checkpoint friendly laptop bags has the hinge on the top with the handle and shoulder straps along the hinge line as shown in Figure 6. To prepare this style of bag for x-ray screening the user separates the two compartments from the bottom and lays the flattened bag on the belt (Figure 7). Some manufactures have buckles to secure the two compartments. In those cases the buckles need to be unsnapped before the two halves can be separated. The Aerovation CPF® laptop bag and trolley bag uses Velcro™ to hold the two halves



Figure 6

together so a gentle pull is all that's needed to prepare the bag for inspection. The biggest advantage to the top hinge butterfly is when the inspection is completed and it's time to leave the checkpoint they require nothing more than lifting the bag off the conveyor to restore the bag to the carry configuration. In the case of the Aerovation CPF® bags there is no post checkpoint buckling either. The simple act of picking the bag up is all that's required.

Additionally, the top hinged designs afford the maximum amount of protection for the laptop because there is substantial padding on all sides of the computer and there is no chance of accidentally trapping other items in the bag as is easy to do with the bottom hinge style.



Figure 7

Aerovation was part of the first wave of manufacturers to submit actual prototype bags to TSA in early May of 2008. The design of the Aerovation CPF® bags, therefore, met all 4 of the initial requirements sought by the TSA. Since, TSA relaxed the requirements to just the x-ray transparency element dozens of manufacturers have declared their products as checkpoint friendly. However, only the Aerovation CPF® meets all the requirements

and does it more easily and faster than the old gray bin method. Manufacturers who put your laptop computer out in the open whether by tray or butterfly design completely misread the TSA requirement for clear and unobstructed x-ray view. The bottom hinge butterfly and tri-fold designs takes much longer to prep and recover than the old gray bin system and the sleeve system ties for the time it took before the program started.

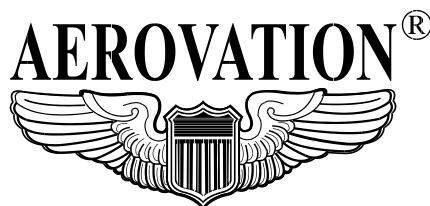
The speed, ease of use and security of the CPF® line of laptop bags far exceeds that of any other bag on the market.

When choosing a checkpoint friendly design remember, it's not about getting into the checkpoint, it's about getting out. With Aerovation CPF® checkpoint friendly bags you'll be at the gate while everyone else is trying to get their bags reassembled.



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