

Redesigned for a Safer Ride

What are the changes and the benefits with the changes?

The changes are geared toward crew safety and ergonomics. We all came in with similar goals to design an ambulance that is safer for the attendant and patient in the back while allowing the medic to do all the functions of their job without undoing their seat belt or getting out of the seat.

As an example of our thought process, I asked the question, "When I was a flight paramedic in a helicopter, I was able to do all the patient care without getting out of my seat belt or seat. Why then, can't that be done on a ground ambulance?" Granted the space is different, but with more space in a ground ambulance, we should be able to accomplish this concept.

The new units are built by Road Rescue on a Dodge 4500 RAM chassis. The new ambulance is more durable, safer and a lighter unit. With Road Rescue, the unit will have no wood components in it. It is an all-aluminum patient compartment build. This will also be a money saver later on when we remount these units. The durability of the all-aluminum build will tolerate and handle remount better than the all wood configuration cabinetry.



The following are the changes we made and the reasoning behind them, starting at the front of the ambulance and working toward the back:

- **Safety:** This new ambulance design has better stopping ability and weight distribution increasing the safety of the unit.
- **Collision safety:** This ambulance has a much sturdier patient compartment.
- **More intersection emergency lights for increased visibility:** We added some small LED flashing lights to the brush guard that face to the side for added visibility of the nose of the ambulance entering an intersection.
- **Each front fender has a camera:** The patient care module or the box on the back is going to be 3 inches wider, with that in mind we added some additional safety equipment. There are cameras on each front fender facing back along the side of the unit. When you put the unit in reverse the video screen on the dash shows the backup camera like the current units but will also be divided up to show each side of the ambulance as well as the back. This will increase your visibility of the area around the unit. The cameras will also automatically come on with each turn signal; when you put on your right or left hand turn signal the video screen will show that respective side of the ambulance.



- **Scene lights:** The cool bar on the current units has 45-degree white lights on each side that flash while you are responding to a call, for increased visibility upon entering intersections. These lights will become solid white lights when you turn on your left or right scene lights. Why did we do this? Have you ever pulled up near an address and noticed that you have to look out the side window toward the back a little to allow the sidelights to illuminate the addresses? Well with these cool bar white lights becoming solid white light when you turn on the respective right or left scene lights you will have more white light visibility off the front side of the ambulance to locate addresses.
- **360-degree increase night time visibility:** When you place the unit in reverse all the scene lights, including all the side lights and the diagonal white lights on the cool bar will come on. With this illumination you will have more visibility at night of not only the rear area of the unit, but the sides and front fender areas while backing.
- **Changes inside the cab:** With input from field crews we moved the primary dispatch radio back and the siren box forward. This is to allow easier access to the siren control box while driving. You won't have to reach back as far to access the siren control box.



- **Electric drivers seat:** The drivers seat on all these units and future units will be electric to increase the drivers comfort and ability to reach all items during driver operation.
- **Patient care module:** The patient compartment design had numerous things in mind; the number one thing was crew safety.
- **The curbside door, or patient compartment side door access:** It has been moved as far forward on the box as possible, there are no longer any roll out trays between the cab and the patient care area. This had to be done to allow for the attendant workstation in front of the attendant seat. The storage shelves are much smaller on the front of the patient compartment (bulkhead) area these will make it easier to access bags and equipment when you open the side door.
- **The bulkhead was also redesigned:** This was to allow for easier access by the mechanics and radio shop to do repairs on all the electronic components.



- **Airway seat (captain's chair):** This is a very similar setup to the current 2014 units with the cooler on the side. It will slide forward and back, but will not rotate. It allows for ease of airway management and access to cooling and medication supplies.
- **Attendant work station:** The work station in front of the attendant seat will have a drawer with a tray for the ePCR tablet to sit on and allow you to do your report on the way to the hospital. by simply lifting up on the tray you can access medical supplies to perform an IV procedure. Once you have completed your vascular access the sharps container will be easily within your reach. If you need to administer medications or access IV fluids, these also will be within your reach.
- **On top of this workstation:** We have a Zoll monitor bracket. The idea is once you get the stretcher in with the patient you can secure the Zoll monitor in the bracket and swivel it for ease of viewing and operation. An inside outside access of your primary and secondary bags is also in this attendant work station. There is a door on the outside of the unit that will allow you to access your bags as needed, but during transport you can also store and access your bags from the attendant seat.

• **Removal of the bench seat concept:** You will be able to get into the attendant seat (what was the bench seat) like the airway seat. This will allow you to remain seated and secure for all aspects of your patient care during transport. The seat has levers on it that allows you to rotate the seat, move the seat toward or away from the patient and even slide forward and back on a track. You will be able to reach the patient and equipment without unbuckling your seat belt. The attendant seat can be rotated into a forward facing position to allow for comfort and safety. There is space for your feet to be flat on the floor as well.



- **No bench seat and two patients:** The question then is, what do we do with a second back-boarded patient when there is no bench seat? This is cool, the CPR seat folds down and makes a platform for the back-boarded patient to be placed on and secured with seat belts. The CPR seat also rotates and rolls forward and backward on a track, so you can position it for your patient care from the right hand side of the patient if needed.

- **Patient compartment switches:** We have also placed switches within reach of all the seats in the back. If you are working from the attendant seat, you will be able to buzz your partner and adjust the lights without getting out of your seat. We also put a check out light switch and re-activation of the rear dump near the rear doors at the back lower right hand side wall; in previous units with the Stealth Power package, you would turn off your unit at the hospital and unload your patient. When you returned from transfer of care in the hospital you would find the a/c and radios still working but the rear dump was no longer in the load position. You would have to go to the cab and hit an activate switch to allow the system to dump for stretcher loading. We placed this switch at the back doors now. We also put in an additional handrail on the right hand side wall at the back of the unit to make it easier to get in and out.



- **Stair chair location:** We have placed the stair chair on the curbside, C-spine compartment (right hand side of the ambulance rear compartment). This was to increase safety for crews accessing this piece of equipment; you won't be out in the street removing this item. It is also easier to get in and out.

- We placed two hidden **access buttons** in the back of the ambulance: The thought process behind this was to increase the ease of securing your unit while on scene away from the unit. One locks and the other unlocks the unit. So, here is how it works: You arrive on scene of a call, you go to the back and remove your stretcher and equipment to go into the address. After you close the back doors, you simply reach down and press the hidden button and lock the whole unit. When you return with the patient, you will more than likely be going to the back of the unit with the stretcher and patient, so you simply press the hidden button and unlock the whole unit. This was to increase the ease of securing your unit while on scene, since it is a requirement to secure your ambulance at the scene and we don't need for extra key fobs.

- We added as many **storage cabinets and compartments** as possible: In fact there is a storage compartment in the step located at the curbside door. This compartment could be used for the required, but hardly ever used, safety equipment like the reflective triangles. This step area also has an additional handrail, since most people used the netting as a means of assisting them to get in and out, it is no longer there nor needed (no bench seat).

- **Liquid springs:** These new units have a new rear suspension system called liquid springs. Instead of a pneumatic or air ride suspension this uses hydraulics with special liquid. What you will notice right away is that the noise during dumping is not present. You won't hear the load hissing noise of the air release, you may hear some gurgling, but that is normal. We currently have two units in the fleet that have the liquid springs: M24 and M20. The ride is much smoother, quieter and there is more stability of the back end while driving.

Date of expected delivery?

It will take us about 2 weeks from the time we get them here in Austin to set them up with radios, MDC's, equipment and medical supplies. The crews should see the units out on the street around the end of November 2016.

How many are expected on the first delivery?

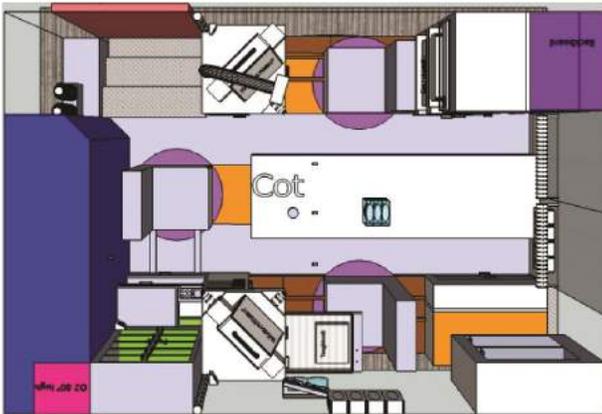
We have a total of 5 city units and 2 county units coming. What is the difference you may be asking? The city units will have the Stealth Power package and the engine can be turned off at the hospital while the Stealth Power will continue to provide power to the radio, MDC, and heater or air conditioner system. The county units will look identical but without the Stealth Power package, this means the engine cannot be turned off at the hospital. We plan to put a means of identifying the units with and without the Stealth Power package on the dashboard.

Has any other system made these changes or are we setting the standard?

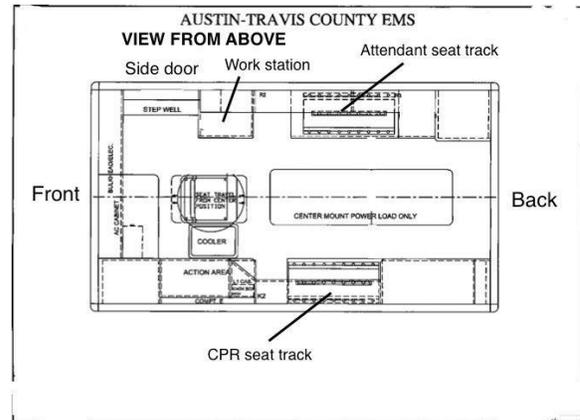
Interestingly enough, other departments have designed similar builds, but not to this extreme. We have numerous departments currently looking at our new design . One of our units will be on display at the Texas EMS Conference in Dallas.

We designed this unit back in early 2014, recently (February 2015) when the Department of Homeland Security, came out with the Ambulance Patient Compartment Human Factors Design Guidebook. CAAS also came out with Ground Vehicle Standard for Ambulances v.1.0 edition the reports describe how ambulances should be designed to insure the safety of the attendant and patient in the event of a crash. What is very interesting about these reports, is that our design from back in early 2014 is the same as what they are suggesting now.

We were very excited to see these reports and review their suggestions. We designed a safer ambulance design before they did, and they are almost 100% identical.



This is the final design concept that the Department of Homeland Security published.



This is the final drawing of our design. This is a top view.

We hope the field understands our goals in the design and build of this new ambulance; this is the way the industry is going. It is a big change and with change comes growing pains. It will take some getting used to, but we think it will make their job safer and easier.

The individuals who tirelessly worked on the design of the new ambulances are:

Jasper Brown

Scott Anderson

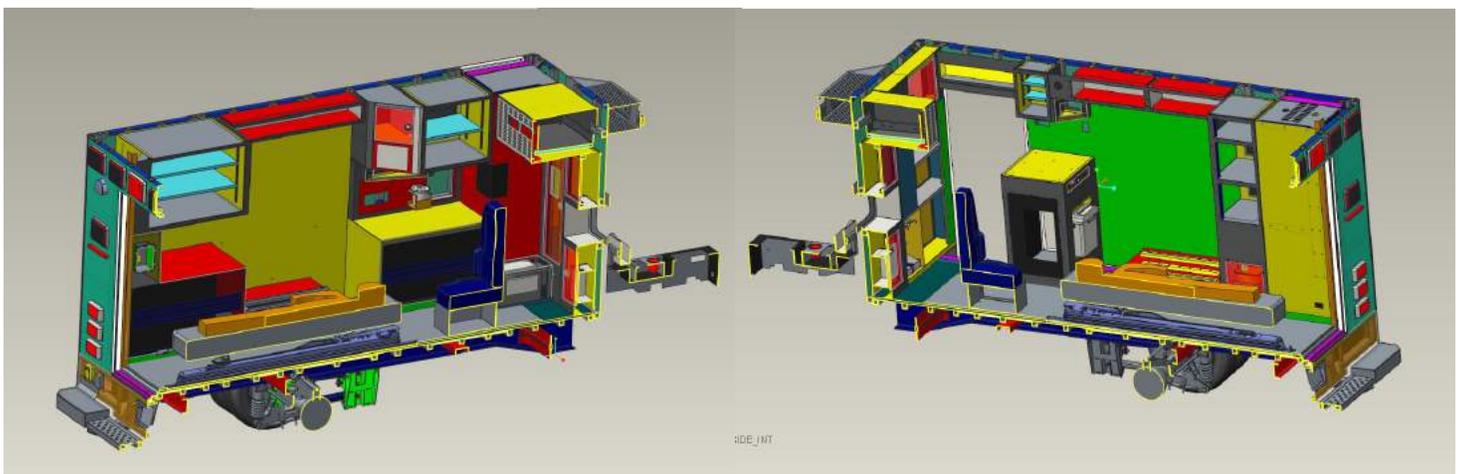
Bradley Lines

George Poulos

Scott Lindsley

Brian Green

Sean Norton



3-D image of the interior design of the new ambulance