

Denver International Airport and Northeast Corridor Transport Ambulance Proposal



**Denver Health Paramedic Division
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Background

The Denver Health Paramedic Division provides Emergency Medical Services (EMS) for the 157 square miles of the City and County of Denver, including Denver International Airport (DIA). The coverage model for the EMS system is a dynamic dispersal model, which provides a fluid matrix of ambulance coverage, and allows for more efficient, cost-effective EMS coverage than static deployment from fixed-base stations permit.

Ambulances are dispersed from a central location, the EMS fleet garage at Denver Health, at the beginning of their shifts. Shifts currently begin at various times between 0500 and 2130 daily. They are street corner posted throughout the City to cover specific geographic areas, and as ambulances are called for service, the remaining available ambulances are moved throughout the City to maximize the coverage.

DIA and Northeast Denver Geography

DIA, Montbello, Green Valley Ranch (GVR) and the Gateway Corridor pose challenges to ambulance coverage because of their relative geographic isolation from the rest of the 911 EMS system. I-70 is the only direct route to the area. This makes movement of resources into and out of the area difficult during rush hour, inclement weather or when traffic flow on I-70 is compromised. Because of this isolation, the Paramedic Division has designated this area for “primary posting.” This means that whenever a posted ambulance is called into service from this area, another is immediately deployed to backfill the coverage. Merely replacing the coverage to this area can take time, in that the closest routinely covered post from which an ambulance can be assigned to the Northeast area is 9 miles away.

The closest receiving hospitals to these areas are University Hospital on the Fitzsimons campus and the Medical Center of Aurora. Both of these are over 16 miles from the airport, and have the same limitations with regard to routing. Denver Health, the closest Level I trauma center is nearly 30 miles from DIA. Very few other areas, if any, in the rest of the City and County of Denver are as distant from a 911 receiving hospital. This distance impacts the time on task for ambulances, and the time they are out of service for other emergencies.

Time on Task

The time on task for an emergency ambulance is measured from the time the unit is assigned to an emergency until the time the ambulance returns to service for the next emergency. This includes travel time to the scene of the emergency, time on the scene, transport time to the receiving hospital, and hospital turnaround time, including patient handoff, ambulance cleaning, and patient care report completion. Calls in the Northeast Denver area, as described above, have longer times on task than in the rest of the City. For ambulance responses originating in the Montbello/GVR area with response destination in the same area or at DIA, the comparative times on task (as defined above) are reflected in the table below:

Avg. Time on Task, First 3Q of 2008	NE Corridor	DIA	Rest of City
Emergency	1:11:25	01:21:06	1:03:00
Non Emergency	01:15:55	01:14:28	00:52:30

The times on task in the table above do not include the travel time required to get an available ambulance back to the service area. Since the two most proximate receiving hospitals to Montbello/GVR/DIA are in the city of Aurora, ambulances are not technically in their service area at the end of the time on task. Thus, additional time is required in order for them to return to Denver to their assigned post. In contrast, for hospital destinations in Denver, ambulances are immediately available in the service area at the end of the time on task. In particular, ambulances backfilling coverage to the Montbello/GVR posts are coming from outside of the area, and require drive time to get to the service area.

At present, there are 11 calls per day on average in the Montbello/GVR/DIA area. While the difference in average time on task for this service area may seem relatively small, the difference adds up to an additional 01:32:37 per day of out of service time, which impacts system-wide coverage. The out of service time itself is an oversimplification of the system impact. These periods of time result in the movement of resources from other parts of the City to maintain coverage to the Montbello/GVR/DIA area. Since the time needed to deploy units to Montbello/GVR/DIA is longer, disruptions to the dispersal of coverage to the rest of the system result from the immediate movement of resources back to the area to ensure timely replacement of coverage.

Current DIA Coverage

The Denver Health Paramedic Division staffs 70 hours per day of paramedic coverage at DIA. These personnel, who are dedicated to the airport, are stationed in the main terminal, and on A and B Concourses. They are responsible for immediate response to all medical emergencies on DIA property (53 square miles), and on Pena Blvd. East of E-470. The DIA paramedics respond using Advanced Life Support (ALS)-equipped Suburbans for response outside of, or to the terminal and concourses, and ALS-equipped golf carts for responses within the terminal and concourse buildings. These paramedics provide rapid response to any medical emergency, but do not provide transport for their patients. They are often awaiting the arrival of the patient from the jetway, and have a much shorter response time on average than a field ambulance does. Having paramedic care to the patient in such a short time allows immediate treatment of patients while transport ambulances are en route. The transport function is provided by ambulances comprising the 911 EMS system. Requests for transport ambulances are answered by 911 EMS resources deployed to the Montbello/Green Valley Ranch area, whenever available.

A more proximate transport resource is important to DIA's ability to compete nationally with other airports for travelers. It is also important to DIA to have a transport resource available on the airport property.

DIA and the Paramedic Division have also been working collaboratively to implement other procedures to facilitate aeromedical transport of critical patients as well as radio procedures to maintain global awareness of responding ambulance locations and timeframes for response.

Proposed Coverage Model

In addition to process improvements already implemented, the provision of dedicated transport ambulance service to DIA led to the planning group's investigation into three main design options. The consensus of the planning group is that one ambulance should be posted at Denver International Airport and coverage increased in the Montbello/Green Valley Ranch area to decrease backfill and response times. The options investigated and the planning group's recommendations are below.

Option 1

The first option examined was to continue with the current staffing and coverage practice. This option results in the response metrics above and does not satisfy defined expectations. Although it offers the lowest financial, operational, and personnel costs, this option was seen as the least effective option, and received the least consideration.

Option 2

This option essentially constitutes a separate EMS system. Three ambulances would be permanently assigned to the DIA/Montbello/GVR area. The DIA unit would be a "split staffed" ambulance, with one paramedic and one EMT. This unit would rendezvous with the DIA paramedic, thus meeting the NFPA requirements for two paramedics at the scene of all ALS emergencies. Two Montbello/GVR ambulances would be ALS units, staffed in a dual paramedic configuration. The three ambulances would likely be deployed from the Montbello Clinic at 4755 Peoria or a similar location. Six employees would staff the ambulances from that location for each shift change and deploy to their coverage areas from there, rather than from the Denver Health Paramedic Division, on Denver Health's main campus. The DIA ambulance and its assigned employees would be badged and trained to function inside the movement area on DIA property without escort, but the Montbello/GVR paramedics would not have the same level of training. When one of the three units responds to a call, the crew would transport the patient to the hospital and then return to their operational area. The dispatching of these three ambulances would need to be managed by a dedicated dispatcher to ensure they would be dedicated to their response area and not pulled into the EMS dispersal for the rest of the City.

Several other issues were noted with this plan. First, transporting ambulances would not be available for additional calls outside of their dedicated response areas. This is especially true with the trained DIA “split” crew, as they would not meet the two paramedic goal. Denver International Airport would be without a transport ambulance while the assigned unit was on a call, transporting a patient, and then returning to DIA. “Backfilling” DIA with other units would be cumbersome and inefficient because the backfill ambulance would leave when the DIA unit returned. This would result in multiple trips to DIA for the sole purpose of providing coverage.

Second, this option would result in greatly increased scheduling, dispatching, and supervisory responsibilities. DIA would not have a transport ambulance during shift changes at the Montbello Clinic, for example. Establishing a separate schedule with specific trained paramedics and ensuring compliance with the separate system would increase supervisory workloads significantly. Dispatch responsibilities would increase greatly with what essentially amounts to a second system. To preserve the integrity of the resources dedicated to this distinct, geographic area, a dedicated dispatcher and dispatch channel would be assigned to these units. Additionally, this would avoid duplication of responses and complications associated with managing parallel systems on the same radio channel.

Third, this option relegates resource management to a more static deployment model, reducing the efficiencies gained by fluid dispersal of mobile ambulances to meet variable call loads.

Fourth, efficiency is further compromised unless patient transport destinations options from DIA/Montbello/GVR are strictly limited. Taking the DIA unit out of service for a transport to Denver Health would take much longer than a transport to University Hospital or the Medical Center of Aurora. Patient choice and customer satisfaction are also compromised by limiting available transport destinations.

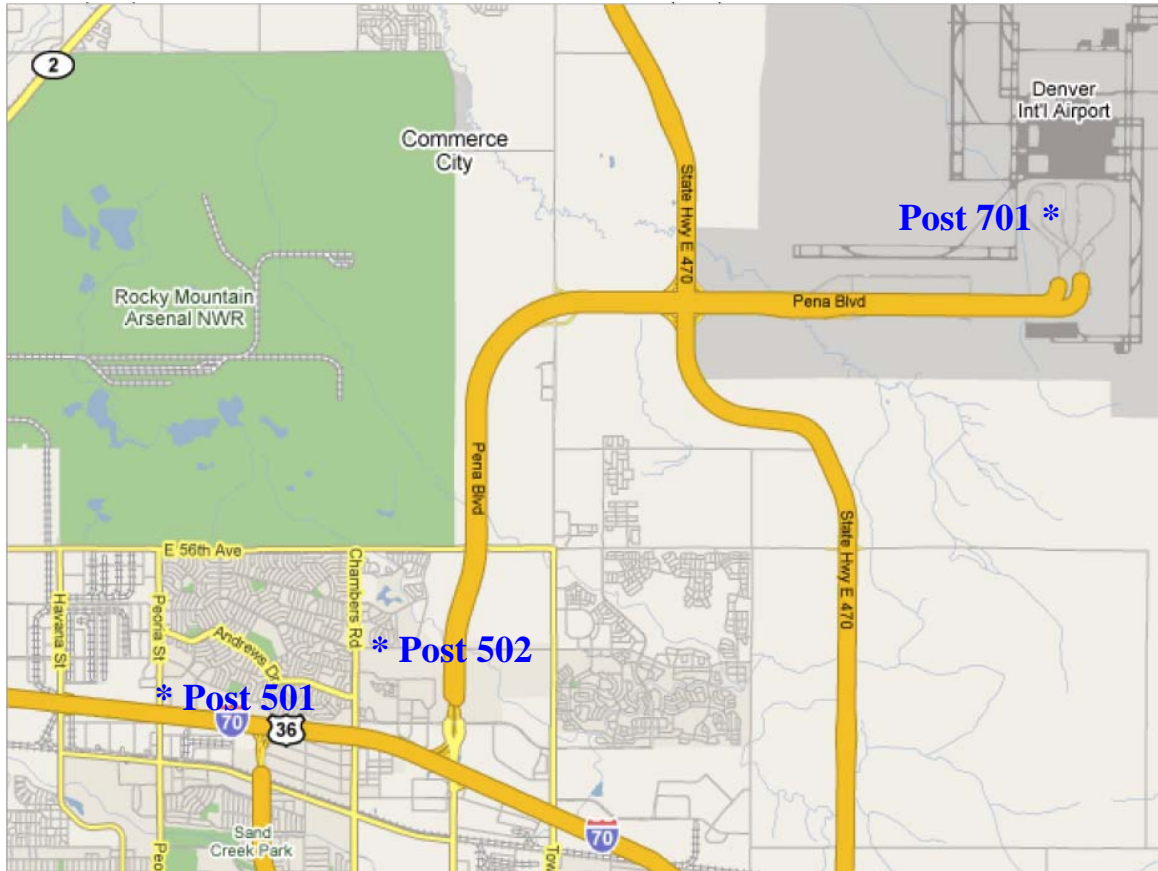
Finally, a remote ambulance deployment location would make fleet maintenance and supply chain management much more difficult. Rather than maintaining, supplying, assigning, and deploying ambulances from a central location, as is done currently, the addition of a remote location would result in decreasing economies of scale and the need for redundant processes and equipment.

We believe that a transport ambulance dedicated solely to the airport would not have the intended benefit considering the loss of this coverage with each patient transport. By the historical time on task information, each transport results in a loss of between 01:15:00 and 01:22:00 of coverage. Having only three ambulances to draw from during peak loads may still lead to instances where no ambulance is available for DIA, Montbello or GVR. Additionally, substantial out-of-service time will result from each transport, reducing area coverage with each.

With these problems discovered, Option 2 was discarded. But some of the tenets of this system were incorporated into Option 3.

Option 3

This option is the best of the three. It increases the available ambulance coverage in both DIA and Montbello/GVR, while mitigating the potential problems explained in Option 2.



This plan is to assign an ALS ambulance to Post 502 (Green Valley Ranch Blvd. & Chambers) on a 24-hour basis. Denver International Airport (henceforth Post 701) would be staffed by an ALS ambulance between the hours of 0600 and 0200. Unlike Option 2, however, this unit would not require badging and training to function without an ambulance escort on the property. DIA has assured Denver Health that an ambulance escort will be available whenever it is needed. This would allow any available ALS ambulance to staff Post 701. Post 501 (Peoria St. & I-70) would be posted between the hours of 0600 and 0200, as well.

Post 502 and DIA (Post 701) would be “primary posts” during their operational hours. This means that when an ambulance posted at Post 701 is requested for transport by the dedicated DIA paramedics, or if the Post 502 unit transports, another unit would immediately be assigned to backfill that post and assume responsibility for all calls in that area. Post 501, the tertiary coverage post, would not be as aggressively backfilled from citywide resources, depending on the status of Post 502 and 701 coverage. This would result in approximately 2.7 ambulances being assigned to the DIA/Montbello/GVR area between 0600 and 0200. Backfill for Post 502 and DIA could come either from the

rotation of units in the operational area or from city units. It should also be noted that “primary posting” means that backfilling units would be unavailable for other calls while en route to these posts.

This option mitigates the problems noted in Option 2. First, it ends the inefficient rotation of units from DIA (DIA unit runs a call, replacement sent to DIA, DIA unit returns to airport, replacement unit reposted elsewhere). Second, it has no effect on supervisory, scheduling, or dispatching responsibilities above current expectations. Third, the efficiencies of the dynamic dispersal of mobile resources are continued, rather than halted. Fourth, destination limitations would be unnecessary – if the DIA unit transports to Denver Health, for example, it is merely replaced by another unit. The original DIA unit can be assigned to a post in the city proper once it has returned to service. Finally, fleet maintenance and supply is unchanged from current practices, eliminating the need for redundant procedures, operations, and equipment.

Discussions with Denver International Airport personnel, and drive time experiments indicate that posting the ambulance at the main terminal at Door 400 would meet DIA’s response time expectations. It has been indicated that ambulance escorting responsibilities are not an issue, and that DIA badging and training are unnecessary. The planned expectations for crews assigned to Post 701 are that they:

- Monitor DIA paramedic radio traffic for calls that may result in a transport request.
- Proceed to the ambulance and be ready to respond to a transport request whenever a DIA paramedic requests transport.

From the post at the main terminal, most locations on the DIA property should be reachable in nine minutes.

Simulation

The third option was tested by a mathematical simulation using historical data, by Dr. Harold Gabow, PhD.¹, with assistance from Denver Health Paramedic Division personnel. Every EMS call has certain specific actions that can be reliably replicated:

- An ambulance’s starting location is known, as is the call location.
- The ambulance’s response time between its current location and the call location can be modeled.
- The time spent on scene can be extracted from historical records.
- The disposition of the call (i.e. hospital transport, refusal of care, etc.) can be extracted from historical records.
- The destination and the time to travel there can be extracted from historical records.
- The “turnaround time,” the time spent at the hospital can be extracted from historical records.
- The time to return to post can be estimated.

¹ Dr Gabow is a retired professor of Computer Science and Mathematics at the University of Colorado at Boulder.

In addition to the above time points, certain points such as travel distances, enroute locations, correct posting decisions, and future calls can also be modeled.

The simulation operated with various assumptions and real data. The call history for the area east of Havana Street was extracted for the time period between November 1, 2007 and October 31, 2008 (I need to check this). When real data were available, for data such as the scene time, transport destination, transport time, and turn-around time, they were used. When real data were not available, such as for response times from a location different than from where the real call originated from, reasonable assumptions were made. The assumptions were designed to be conservative, so that any findings would be a “worst-case” example. Examples of assumptions include response times from posts. The historic data may have reflected a response time from a location other than a designated post, but by increasing the simulated coverage in the Montbello area, the simulated response would begin at a specific post, or a different post. Another example of a conservative assumption was the assumption that all responses from the DIA post (Post 701) to anywhere on the airport property had an 8:59 response time. This is obviously conservative, rather than an expected average. Response times for posts were calculated by averaging the emergent and nonemergent response times (separately) from each post to specific Denver Fire Department map pages. The Denver Fire Department map page grid consists of squares approximately one mile on a side. The location of every call captured in Computer Aided Dispatch (CAD) records is related to a map page. This allowed us to calculate overall averages better than a larger geographic delineation, such as zip code or council district would. Unfortunately, some map pages have very low numbers of responses. In such cases, the mean response time between a post and the low-volume map page could present skewed data. All of the call averages were corrected by hand using experience, GoogleMaps, MapQuest, and the response averages.

After the list of calls was extracted from the CAD database, the simulation was programmed with the underlying rules outlined above. Constraints were placed upon the simulation to more accurately reflect presumptive reality. One example of this was the initiation of a rule for any call west of Chambers Road to be handled by the Post 501 ambulance. This rule held true even if the call was across the street from the ambulance posted at Post 502. Post 501 can reliably reach all calls west of Chambers in under nine minutes. Using the Post 501 units to respond to these calls kept the 502 unit in service, and able to reach both Montbello and Green Valley Ranch in 8:59.

The simulation was then run using the assumptions for posting above. If a unit was assigned to respond to a call before it had reached its assigned post, the response time would again have to be estimated. The common assumption used was to use two minutes to travel from one map page to another, in the case of a nonemergent response. An emergent response resulted in a response time that was 90% of the calculated nonemergent response time. Both the two minute map page to map page travel time and the 0.9 emergent factor are felt to be conservative.

The historic response time data analyzed excluded Denver International Airport, but reflected 68% compliance with a response time of 8:59 for Montbello and Green Valley

Ranch using the current coverage model. The simulation model, using the proposed coverage plan, found that the calls in DIA, Montbello, and Green Valley Ranch would experience a response time under nine minutes 89% of the time. Calls handled by the DIA post (Post 701) and Post 501 (Peoria & I-70) demonstrated response times under 9 minutes 100% of the time, to virtually all locations on DIA property and the Montbello area, respectively. Calls handled by the Post 502 (Chambers & Green Valley Ranch Blvd) ambulance had a response time under nine minutes only 63% of the time, however.

It was noted that the simulation response times for many of the areas of Montbello and GVR from Post 502 are only slightly beyond the 8:59 compliance standard for responses. By adding a minute to the compliance mandate for response time, making it 10:00 rather than 9:00, the compliance of responses from Post 502 changes to 98%. A jump in compliance of this magnitude was surprising and reflects slight “misses” in 35% of responses from Post 502. The simulation group is confident that the calculated 63% compliance rate reflects the conservative response time assumptions mentioned above, and that reality will be closer to the 98% compliance number. Dr. Harold Gabow explains, “Thus, if we believe our travel times are pessimistic enough to add 1 minute to the true travel time, we can say that our simulation approaches 90% compliance... This belief is plausible since our travel times are based on map pages, whose size introduces uncertainty on the order of 1-2 minutes.”

The simulation also checked overall area compliance without post rotation. The absence of post rotation is the plan discussed in Option 2, where ambulances transporting patients are away from post until they return. The response time compliance without backfill was simulated at 77%. This confirms the assertion that the semi-permanent post assignments outlined in Option 2, above, are inefficient.

Implementation Requirements

It is important to examine the 911 EMS system as a whole, since all ambulance resources under the proposed model will continue to be managed in this fashion. Implementation of this Montbello/GVR/DIA ambulance management initiative has great implications on global system performance. Option 3 will require expansion of system resources, and determining the global impact of the coverage plan requires more detailed analysis to determine the effects of this change on the rest of Denver’s 911 EMS system. The analysis of the Montbello/GVR/DIA area took months to complete, and is far less complex than the analysis of the entire system. It is estimated that a system-wide analysis using the same methodology would take up to a year to complete. There are software vendors who provide sophisticated analytical predictive deployment software to complete analyses such as these, which use historical Automatic Vehicle Locator (AVL) data to more accurately determine travel times and system performance models. The group recommends pursuing such software.

Personnel and Equipment

To implement the recommended plan for DIA and Northeast Denver coverage without a reduction of coverage elsewhere in the City, the Paramedic Division will require an additional 20 FTE paramedics. This will allow staffing of enough additional unit hours to provide 20 hours per day of dedicated transport ambulance coverage to DIA, and to “primary post” the secondary coverage post 24 hours per day from which the DIA post will be backfilled when the dedicated ambulance is called into service. The net additions to coverage in the area are two ambulances above the one currently “primary posted” at Post 502. The mathematical model used 2.7 ambulances for the coverage number. Three ambulances in the Northeast area will err on the conservative side, and should produce the expected performance of 90% compliance with response time criteria. The annual amortized cost estimates for two fully-equipped, staffed ALS ambulances, a command vehicle and supervision and support are below:

Annual Cost	Personnel	Equipment (Amortized)	Total
Operations	\$1,335,570	\$124,390	\$1,459,960
Supervision	\$81,371	\$28,278	\$109,649
			\$1,569,609

The cost estimates are based on current system modeling and 2009 pay scales, with dual-paramedic ALS ambulances. There is a substantial limitation on the speed with which this plan can be implemented, however. Year to date, the Paramedic Division has hired 32 paramedics, and has lost 27 paramedics through voluntary resignations, terminations, and transfers. The net gain of seven paramedics over eleven months is a substantial limitation, considering that this proposed initiative will require twenty.

Comparison of Implementation Options and Final Recommendations

Several options for implementation of the proposed plan for dedicating an ambulance to DIA coverage have been suggested and examined. The timeliness of implementation is one of the key differences in the models. After considering all variables, the Paramedic Division leadership group offers the following recommendations:

The timeliest mechanism for this implementation is to pursue a paramedic/EMT split car model as an intermediate step toward returning to an all-ALS system-wide model of EMS service delivery. This may include the addition of “Fly Cars” to supplement dual-paramedic ALS ambulances or paramedic/EMT ambulances. The concept of “Fly Cars” offers exciting possibilities for innovative services and responsibilities. They may also mediate some of the negative perceptions of employees. The transition to all-ALS through a split paramedic/EMT staffing model provides for the following:

- Immediate equivalent of five ambulances per day without any FTE additions

- Ability to implement the DIA and Northeast Denver coverage plan without delay
- Net additions to the rest of the 911 system which will drive performance toward the NFPA requirement of 90% in all areas
- An approximate 45%-55% dual paramedic vs. paramedic/EMT configuration based on current staffing
- All ALS training ambulances will remain dual paramedic
- Decreased burden of resource dispersal for dispatchers
- Less rigorous call screening necessary
- Error-proof resource assignment
- Consistent level of care for all patients
- All ambulances are ALS capable
- Decreased leadership burden of system management
- Improved system efficiency by reduction of unnecessary multiple unit assignments
- Decreased QA/QI burden
- Standardization of fleet and equipment deployment
- Handoffs from first responders always to a higher level of care

The use of a split paramedic/EMT model is not a panacea, however. There are some caveats to using this model, even as a temporary measure:

- Does not meet the NFPA standard of two paramedics on every ALS call, without a supervisor or “Fly Car” paramedic
- Will have dramatic employee opposition, including the potential for corresponding political and media ramifications, without the guarantee that this is a temporary measure, or potentially with the addition of “Fly Cars.”
- May be seen as a degradation of service quality from dual-paramedic as it is an historic standard of care for Denver
- May lead union argument that 2nd paramedic to meet NFPA should be on fire engines

For the purposes of these recommendations, each category below was ranked on a 1-5 scale, with 5 being the best option, and 1 being the least desirable option.

	Current Model (Dual-Paramedic ALS, Dual-EMT BLS)	All-ALS Personnel Model	Split Paramedic/ EMT ALS Ambulances	Split Paramedic/ EMT ALS Ambulances with Single-Paramedic ALS “Fly Cars”
Timeline for Implementation	2	2	5	3
Financial Impact	2	2	5	4
Patient Impact	3	5	4	4
Employee Impact	3	5	1	3
Operations Impact	2	5	4	5
Equipment/Fleet Impact	2	5	5	4
Political Impact	3	5	2	4
Dispatch Impact	1	5	5	4
Total	18	34	31	31

**Current Model
(Dual-Paramedic ALS, Dual-EMT BLS)**

Criteria	Comments
Timeline for Implementation of DIA/NE Denver Plan	<ul style="list-style-type: none"> ▪ Will require at least 12 months to hire and train 20 FTE paramedics ▪ Dependent on availability of qualified paramedic applicants ▪ Dependent on competitive salary
Financial Impact	<ul style="list-style-type: none"> ▪ Most costly ▪ Need 20 FTE paramedics
Patient Impact* (*Considers both care and patient and provider perception of patient care)	<ul style="list-style-type: none"> ▪ Some ambulances with <u>no</u> paramedic ▪ Occasionally BLS unit incorrectly assigned to ALS call ▪ BLS units cannot provide analgesia ▪ BLS may not be able to manage a patient whose condition deteriorates ▪ Delays in provision of ALS care when BLS must request ALS co-response ▪ Handoff of patients from first responders to BLS crews could be perceived as not reflecting a higher level of care ▪ Inconsistent level of care, depending on level of capability of ambulance crew
Employee Impact	<ul style="list-style-type: none"> ▪ ALS personnel may enjoy having BLS handle lower acuity calls ▪ Career progression for BLS to ALS ▪ Concern among employees about BLS inability to administer analgesia ▪ Regular employee concern about screening of calls as BLS
Operational Impact	<ul style="list-style-type: none"> ▪ Managing two parallel systems requires more oversight and effort by leadership ▪ BLS must occasionally request ALS, leading to assignment of multiple resources to same call ▪ Requires two staffing plans and schedules for ALS/BLS ▪ Requires two posting plans for ALS/BLS ▪ Requires thorough QA/QI oversight of BLS responses ▪ Not enough BLS resources to cover geographic area effectively ▪ Cross-training of BLS personnel has allowed for ease in ESP and BLS assignments ▪ Requires separate employee meetings and training to address ALS/BLS specifics ▪ BLS personnel easy to recruit but are transient workforce
Equipment/Fleet Management Impact	<ul style="list-style-type: none"> ▪ Requires VST to assign two different types of sets of equipment ▪ Requires stocking of different types of kits for ALS/BLS ▪ All vehicles the same
Political Impact	<ul style="list-style-type: none"> ▪ Meets NFPA requirement for 2 paramedics on all ALS calls

	<ul style="list-style-type: none"> ▪ Some citizens will get a <u>no</u> paramedic ambulance, which may become a union platform ▪ BLS ambulances may be seen as decreased level of care ▪ May lead to DFD argument that they could provide BLS transport services ▪ Not enough public education about reasons model works ▪ Public perception of up to 30 minute non-emergency responses
Dispatch Impact	<ul style="list-style-type: none"> ▪ No current standardized deployment strategy for ALS or BLS ▪ Requires rigorous call screening to prevent assignment of wrong resource ▪ Requires management of two parallel posting plans ▪ Prone to potential errors in unit assignment even with accurate call screening ▪ May lead to ALS/BLS ambulances assigned to same area ▪ Leaves dispatchers to guess travel time of BLS ambulances to meet reasonable code 9 responses ▪ Potential for negative patient outcomes and liability from sending the wrong resource

All-ALS Personnel Model

(Could also be enhanced with Single-Paramedic ALS “Fly Cars”)

Criteria	Comments
Timeline for Implementation of DIA/NE Denver Plan	<ul style="list-style-type: none"> ▪ Will require at least 12 months to hire and train 20 FTE paramedics ▪ Dependent on availability of qualified paramedic applicants ▪ Dependent on competitive salary
Financial Impact	<ul style="list-style-type: none"> ▪ Most costly ▪ Need 20 FTE paramedics
Patient Impact* (*Considers both care and patient and provider perception of patient care)	<ul style="list-style-type: none"> ▪ Dual-ALS personnel able to manage any problem ▪ Two paramedics able to separate to manage multiple ALS patients ▪ Two paramedics able to discuss complicated diagnoses to provide best treatment ▪ Both crew members with equal training and capability to perform all necessary procedures and assessments ▪ Handoff of patients from first responders always to higher level of care ▪ Consistent level of care for all patients
Employee Impact	<ul style="list-style-type: none"> ▪ Concern from BLS employees about job security ▪ Highest ALS personnel employee confidence and preference ▪ ALS personnel would have to take on current BLS calls ▪ BLS personnel relegated to ESP, CCT and inter-facility duties over time ▪ Will not eliminate the need for BLS personnel, or the step on the career ladder
Operational Impact	<ul style="list-style-type: none"> ▪ Decreased oversight burden with single level of provider ▪ Recruitment and retention problematic in face of national paramedic shortage ▪ Single ambulance schedule ▪ Decreased leadership burden of oversight ▪ Consistent training offerings
Equipment/Fleet Management Impact	<ul style="list-style-type: none"> ▪ Single type (ALS) equipment assignment ▪ All vehicles the same ▪ Requires more 12-lead monitors
Political Impact	<ul style="list-style-type: none"> ▪ Meets NFPA requirement for 2 paramedics on all ALS calls ▪ Is an historic standard of care for Denver ▪ City confidence in a <u>paramedic</u> EMS service ▪ Employees will not make a political stand against this model
Dispatch Impact	<ul style="list-style-type: none"> ▪ Single posting plan as all resources have same capability ▪ Call screening is not as much of a concern as all ambulances are ALS capable ▪ Unit assignment is error-proofed by having a single level of capability ▪ Decreased liability

Split Paramedic/EMT ALS Ambulances

Criteria	Comments
Timeline for Implementation of DIA/NE Denver Plan	<ul style="list-style-type: none"> ▪ Almost immediately feasible, as ALS resources will be increased immediately by staffing changes ▪ May require additional BLS staff, but are easier to recruit than ALS
Financial Impact	<ul style="list-style-type: none"> ▪ Initially without financial impact ▪ Future savings with each paramedic position replaced by EMT ▪ Would eliminate need to hire paramedics quickly
Patient Impact* (*Considers both care and patient and provider perception of patient care)	<ul style="list-style-type: none"> ▪ All ambulances have ALS capability ▪ Different level of training and capability of individual crew members ▪ Paramedic unable to have peer-level consultation or assistance during a call ▪ Handoff of patients from first responders always to higher level of care ▪ Consistent level of care for all patients
Employee Impact	<ul style="list-style-type: none"> ▪ Highest level of resistance from ALS employees ▪ Will lead to decrease in morale ▪ Improved professional growth of BLS ranks through exposure to ALS calls ▪ Requires more autonomy from ALS personnel ▪ May increase ALS workload ▪ Career progression for BLS to ALS
Operational Impact	<ul style="list-style-type: none"> ▪ Dual provider levels will require current level of leadership oversight ▪ BLS personnel easy to recruit but are transient workforce ▪ Will increase available ALS resource pool through staffing model without additional FTE's
Equipment/Fleet Management Impact	<ul style="list-style-type: none"> ▪ Single type (ALS) equipment assignment ▪ All vehicles the same ▪ Requires more 12-lead monitors
Political Impact	<ul style="list-style-type: none"> ▪ Does not meet NFPA requirement for 2 paramedics on all ALS calls ▪ May be seen as a degradation of the level of care ▪ May lead to dramatic employee political pushback ▪ May lead union argument that 2nd paramedic to meet NFPA should be on engines
Dispatch Impact	<ul style="list-style-type: none"> ▪ Single posting plan as all resources have same capability ▪ Call screening is not as much of a concern as all ambulances are ALS capable ▪ Unit assignment is error-proofed by having a single level of capability ▪ Decreased liability

Split Paramedic/EMT ALS Ambulances with Single-Paramedic ALS “Fly Cars”

Criteria	Comments
Timeline for Implementation of DIA/NE Denver Plan	<ul style="list-style-type: none"> ▪ Will be rapid, but will not provide as immediate a benefit, as will require some ALS and BLS augmentation ▪ “Fly Car” policies, procedures and job descriptions need to be drafted and approved ▪ “Fly Car” DH and CSA pay scales need to be approved
Financial Impact	<ul style="list-style-type: none"> ▪ Will require hiring of EMT’s. ▪ EMT’s are less expensive and easier to recruit than paramedics ▪ May lead to increased “Fly Car” medic pay as responsibility of “Fly Cars” is defined ▪ Cost of increased performance of EMS system is less than the number of ambulances required for same improvement
Patient Impact* (*Considers both care and patient and provider perception of patient care)	<ul style="list-style-type: none"> ▪ All ambulances have ALS capability ▪ Different level of training and capability of individual crew members ▪ “Fly Car” medic able to provide second paramedic benefits on high-acuity calls ▪ Second paramedic available for multiple ALS patients ▪ “Fly Car” medics may be able to take on expanded scope duties for patients ▪ Handoff of patients from first responders always to higher level of care ▪ Consistent level of care for all patients
Employee Impact	<ul style="list-style-type: none"> ▪ Adds career diversity through additional opportunities on “Fly Cars” ▪ Second paramedic on “Fly Car” may alleviate some of the concerns with split cars ▪ May have some of same morale issues of split cars ▪ Improved professional growth of BLS ranks through exposure to ALS calls ▪ Career progression for BLS to ALS ▪ Expanded scope may benefit enterprise and employees
Operational Impact	<ul style="list-style-type: none"> ▪ Progressive system with marketing implications ▪ Increased burden of oversight by addition of “Fly Cars” ▪ BLS personnel easy to recruit but are transient workforce ▪ Additional staffing plan and schedule to manage with “Fly Cars” ▪ Two posting plans to manage ▪ Addition of “Fly Cars” adds other resources that can stop the response time clock ▪ “Fly Cars” could return ambulances to service sooner by completing non-transport calls for them ▪ Special operations standbys can be handled by “Fly Cars” rather than ambulances

	<ul style="list-style-type: none"> ▪ “Fly Cars” could provide operational support for system efficiency as supervisors are currently
Equipment/Fleet Management Impact	<ul style="list-style-type: none"> ▪ Single type (ALS) equipment assignment ▪ Additional vehicle type and numbers to stock and maintain ▪ Requires more 12-lead monitors ▪ Requires the purchase, configuration and equipping of “Fly Cars”
Political Impact	<ul style="list-style-type: none"> ▪ May meet NFPA requirement equivalent with second paramedic on “Fly Car” ▪ May be seen as a degradation of the level of care but less than without “Fly Cars” ▪ May offer innovative opportunities to benefit the health of Denver residents and visitors ▪ May lead union argument that 2nd paramedic to meet NFPA should be on engines ▪ “Fly Cars” stopping response time clock may not be acceptable politically, as with DIA medics
Dispatch Impact	<ul style="list-style-type: none"> ▪ Although all resources have same capability, requires two posting plans ▪ Call screening is not as much of a concern as all ambulances are ALS capable ▪ Unit assignment is error-proofed by having a single level of capability ▪ Decreased liability