



**Fusion Plus:
Integrated, Interoperable, Highly Redundant Command and Control
for
South Carolina and the Southeast Region¹**

"Broadband technologies have advanced so dramatically that it is now feasible to deploy an affordable, fully integrated, regional command and control network that can rapidly replace today's stovepipe systems."²

Many state and local agencies play a role in disaster mitigation. Some also manage day-to-day public safety response and now, the public demands these groups consider creation of information systems using 2-1-1 lines and other dedicated channels.

Everyone understands the value of coordination, but cooperation and the shared use of assets are limited by an incomplete knowledge of new technologies, equipment incompatibilities, time and personnel constraints, the lack of a common institutional experience and the absence of a single organization equipped to take a broad view of this important agenda.

Meanwhile, troubling weather patterns, a sophisticated terrorist threat and increased public response expectations are straining budgets and efficiency. Clearly, neither South Carolina nor our region can continue to muster the investment in communications networks and first, second and third responders that will be required if we continue to pursue a fragmented approach.

Technology can provide powerful leverage for those seeking a secure, redundant and far less expensive alternative.

One of the more promising new applications involves creation of a communication hub, a Fusion Center, which can host a command and control system flexible enough to serve large, diverse populations. This system would:

1. Be multi-functional; capable of dealing interchangeably with man-made and natural events and routine public requests for information on traffic, weather, special events, rumor control, etc.
2. Serve as a reliable backup for local communications centers.
3. Create and administer a network of networks that will maximize the value of existing resources and greatly expand the reach of mutual assistance pacts.
4. Coordinate planning and ensure local support plans are current and executable.
5. Significantly reduce infrastructure costs by hosting data for local agencies in a secure environment, and ensure immediate access to that information through a fault-tolerate, redundant, broadband network.
6. Assist in the activation of mutual assistance plans, requests for federal assistance, positioning and support of reaction forces, execution of evacuation plans, housing of evacuees and preparation of emergency declarations.
7. Be capable of deployed operations at multiple sites.
8. Employ fixed and ad hoc communications networks to ensure responders can communicate among themselves and with the public regardless of the disruption caused by the event.
9. Track depletion of critical consumables (including personnel utilization) and manage the logistics train that will restock stores/replace forces at point of need.

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² Jon Samuels Virginia APCO/NENA conference, February 2008.

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10. Assist in damage assessment, recovery planning and management of recovery efforts.
11. Track expenses in real-time and assure immediate requests for federal reimbursement are submitted.
12. Centrally manage public information to include the provision of a media center capable of supporting a national reporting effort.
13. Produce comprehensive after-action reports with lessons learned and proposed corrective action.
14. Assist in training and administer state and regional exercises.

This Fusion Center would be staffed with personnel representing all critical emergency management disciplines. Their systems would provide:

1. A highly redundant and fault tolerant communications hub.
2. A secure, encrypted database with availability exceeding 99.99%.
3. Access to multiple fixed and broadband communications networks capable of integrating a number of MESH and other ad hoc networks.
4. Superior physical protection (DoD Level 4 with ability to escalate to Level 5)
5. A TIER IV data center providing the highest level of availability against tampering, hacking or outright attack.
6. Deployable field command centers that fully integrate with the system's communications networks.
7. The ability to add communication points with little or no pre-planning or capital investment.
8. The ability to transparently replace critical local communications resources, such as 9-1-1, that might be rendered inoperative.

Equipped in this manner, the Fusion Center can become the nexus for South Carolina and Southeastern US disaster response operations.

It would employ a back office/front office design that would leverage existing capital resources to avoid or significantly reduce projected costs for networks, interoperability, survivability and security. This design would ensure affordable, highly redundant data access, regional and inter-agency data sharing and provide a common level of service to rural and urban communities.

The back office would be housed in DataChambers, a TIER IV data center located in Winston Salem NC that specializes in electronic data storage, network and monitoring solutions, managed hosting applications, co-location services, secure tape vaulting, and records management.

Built by the US government to host a mission that required protection from nuclear attack; this facility is housed in a 44,000 square foot subterranean, hardened structure. Redundancy and durability are designed into every critical component. Power needs are served by an onsite Duke substation fed from two separate power grids, a 1400KW emergency generator capacity and a redundant Liebert UPS system supporting all Data Center equipment. Security is multi-level and capable of meeting the highest DoD standard. (It would be impossible to recreate this asset at today's costs.

Contact is maintained with the field through an internal carrier hotel that is one of the most robust in the nation. Many TELCOs, cable companies and other communications service providers maintain protected wireline and broadband nodes within DataChambers. It is difficult to imagine an event that would overwhelm all these channels.

As the Fusion Center back office, DataChambers would host the data required by agencies participating in the network in discrete files that could only be accessed by the owner or those approved by the owner. Within the network, however, unlimited data sharing could be made available. For example, any emergency manager could immediately assess the status of all available responders within his area or even within the region. That manager could make his

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needs known and quickly begin to position the force he requires. The Fusion Center staff would manage all the logistics inherent in such an operation.

Leveraging this back office avoids almost all the costs associated with the considerable security demands imposed when separate databases are maintained and significantly reduces infrastructure costs associated with redundant server arrays, network deployment and communication links that are duplicated when state and local governments attempt to recreate DataChambers. These savings could approach 70% over a five-year system lifecycle.

Data maintained in this back office would be transmitted to and from using agencies via a multitude of fixed channels and encrypted broadband. Data availability of 99.995% is guaranteed.

The following chart summarizes the advantages of a Tier IV data center:

This chart illustrates Tier similarities and differences

	TIER I	TIER II	TIER III	TIER IV
Number of delivery paths	Only 1	Only 1	1 active 1 passive	2 active
Redundant components	N	N+1	N+1	2 (N+1) or S+S
Support space to raised floor ratio	20%	30%	80-90%	100%
Initial watts/ft²	20-30	40-50	40-60	50-80
Ultimate watts/ft²	20-30	40-50	100-150	150+
Raised floor height	12"	18"	30-36"	30-36"
Floor loading pounds/ft²	85	100	150	150+
Utility voltage	208, 480	208, 480	12-15kV	12-15kV
Months to implement	3	3 to 6	15 to 20	15 to 20
Year first deployed	1965	1970	1985	1995
Construction \$/ft² raised floor*	\$450	\$600	\$900	\$1,100+
Annual IT downtime due to site	28.8 hrs	22.0 hrs	1.6 hrs	0.4 hrs
Site availability	99.671%	99.749%	99.982%	99.995%

*Excludes land and abnormal civil costs. Assumes minimum of 15,000 ft² of raised floor, architecturally plain one story building fitted out for the initial capacity, but with the backbone designed to reach the ultimate capacity with the installation of additional components. Make adjustments for NYC, Chicago, and other high cost areas.

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Front offices will be situated in the Fusion Center and in other centers throughout the service area. Because no network hardware is required, these centers will need only computers, network access and backup power to operate. Hosted data, network management and telephony and radio controllers will be provided remotely through DataChambers. Front offices can be located in relatively soft facilities with point security.

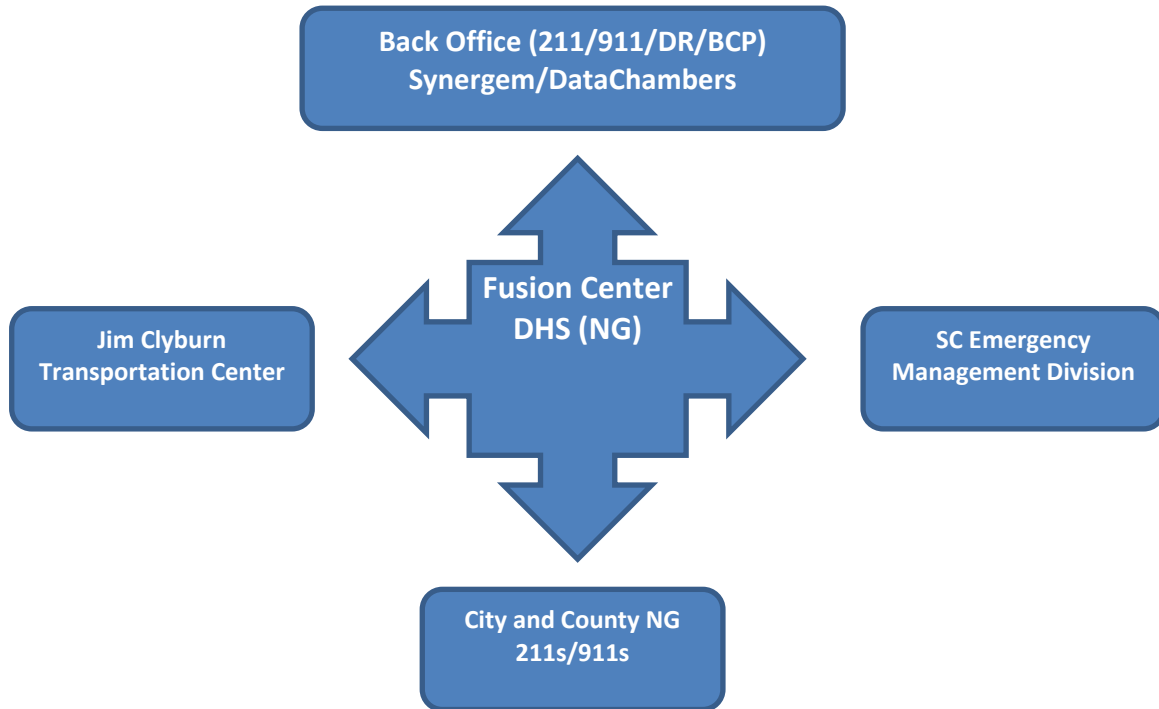
In South Carolina, the Fusion Center can be linked to the Emergency Management Division, the National Guard Operations Center, the Clyburn University Transportation Center, city and county 9-1-1 centers and other critical command and control facilities. All of these centers could become front offices to take advantage of the considerable assets provided by the Fusion back office.

Front offices could share data with each other seamlessly through the Fusion network. The Fusion Center can serve as a backup for each of them and deployed Fusion field command posts can take these front offices directly into an incident area.

Aside from emergency management, the Fusion network can serve many public needs during routine periods. This could include 2-1-1 and many other information delivery functions now handled separately or not at all.

The following diagram summarizes how data would flow through the fusion network.

Fusion Center Data Flows



DR = Data Recovery
BCP= Business Continuity Planning

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