Deployment Technical Review & Analysis Overview

Fitch & Associates has been adding the latest science in deployment analysis to its many reports for the better part of 20 years. Enhancements in technologies have allowed us to make significant progress in deployment and staffing analysis.
This has lead to five (5) distinct innovations in data management.

1) Predictability: The capacity to predict growth over years with high levels of accuracy.

2) Demand Behavior: Model the demand behavior over different segments of time (e.g., months, weeks, or days).

3) Smoothing Principles: The use of smoothing principles to make demand usable. This allows for demand to become a risk management decision and not have clients be at the mercy of the sharp artifact effect of unmanaged demand.

4) Observation Techniques: An observation technique used to understand how the system behaves as resources are added to the system.

5) Geospatial Analysis: A geospatial analysis that evaluates the performance of existing deployment plans.

These analysis techniques are used to develop customized staffing, deployment and workload management plans tailored to each community's unique characteristics. Factors considered include: demand; geography and road network; call volume density and acuity, schedule requirements, and workforce needs.

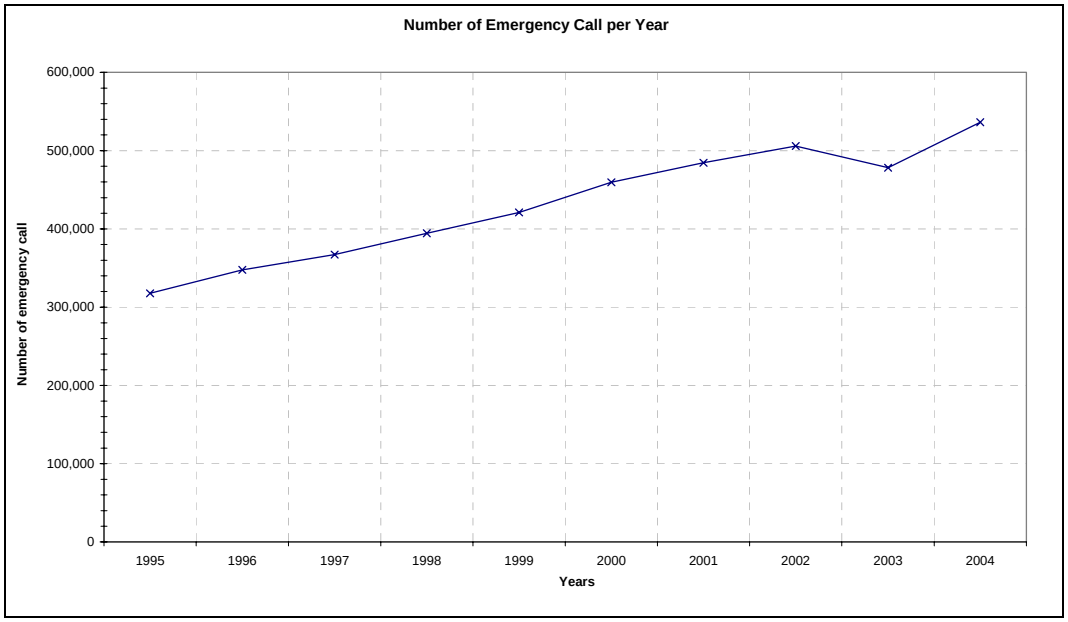
The Five Steps Expanded

1. Predictability: The capacity to predict growth over years with high levels of accuracy.

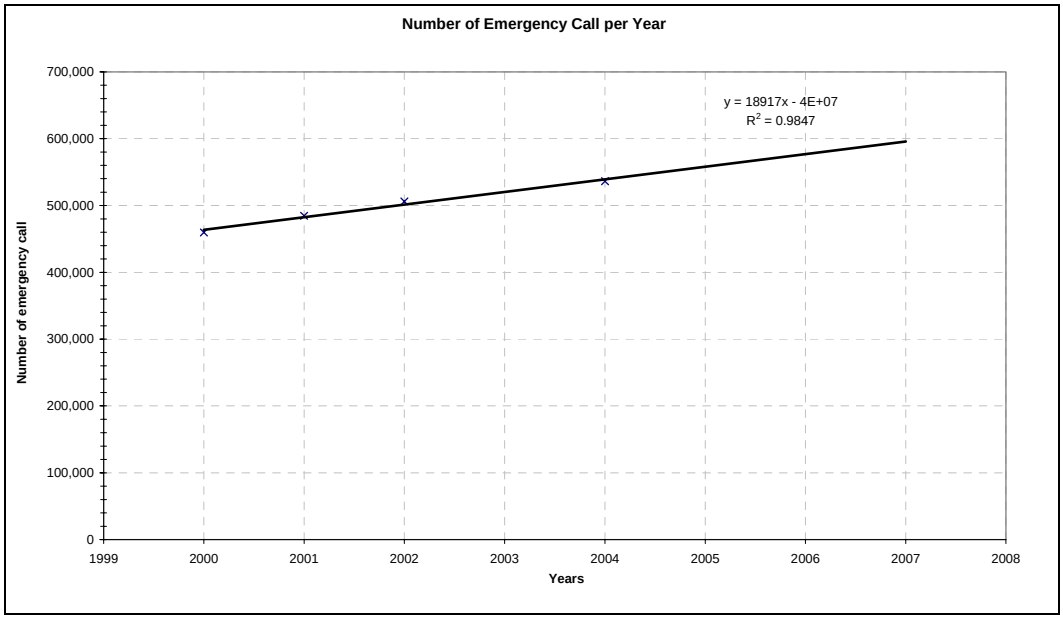
Annual Demand is used to understand the growth pattern of a service. This is the principal tool in determining if the system's capacity to deliver service can be maintained or if major/dramatic changes necessary in order to stop an overwhelming of the system. Causes of system overload can be the result of a lack of human, material or financial resources.

(More)

Observed Annual Demand

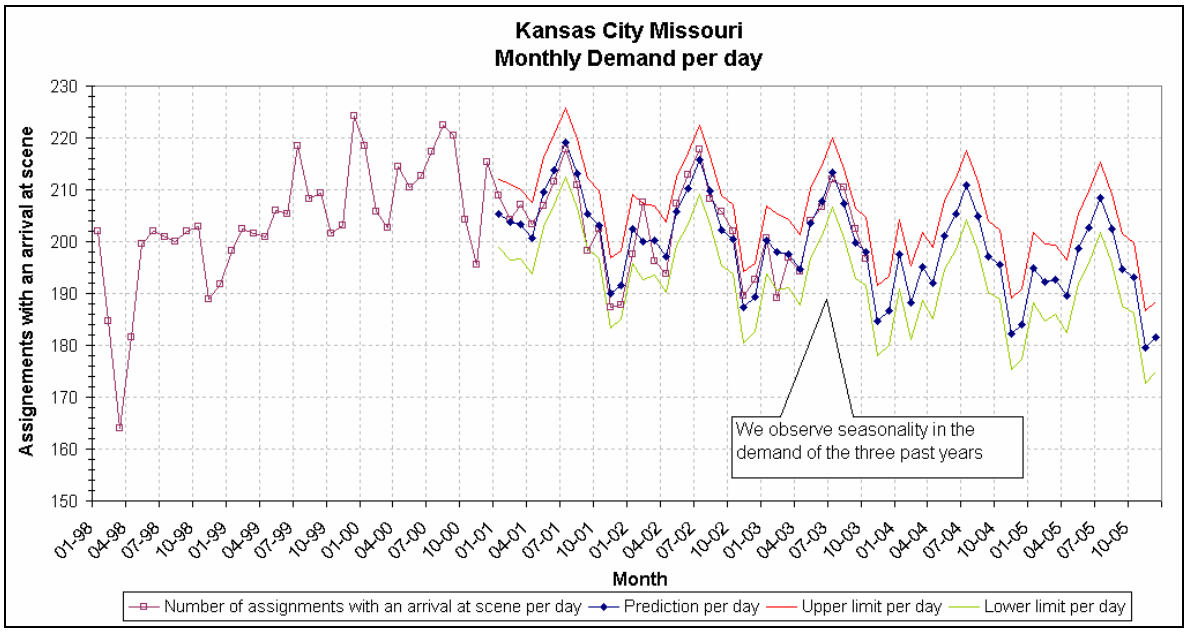


Projected Annual Demand



2. Demand Behavior: Model the demand behavior over different segments of time (e.g., months, weeks, or days).

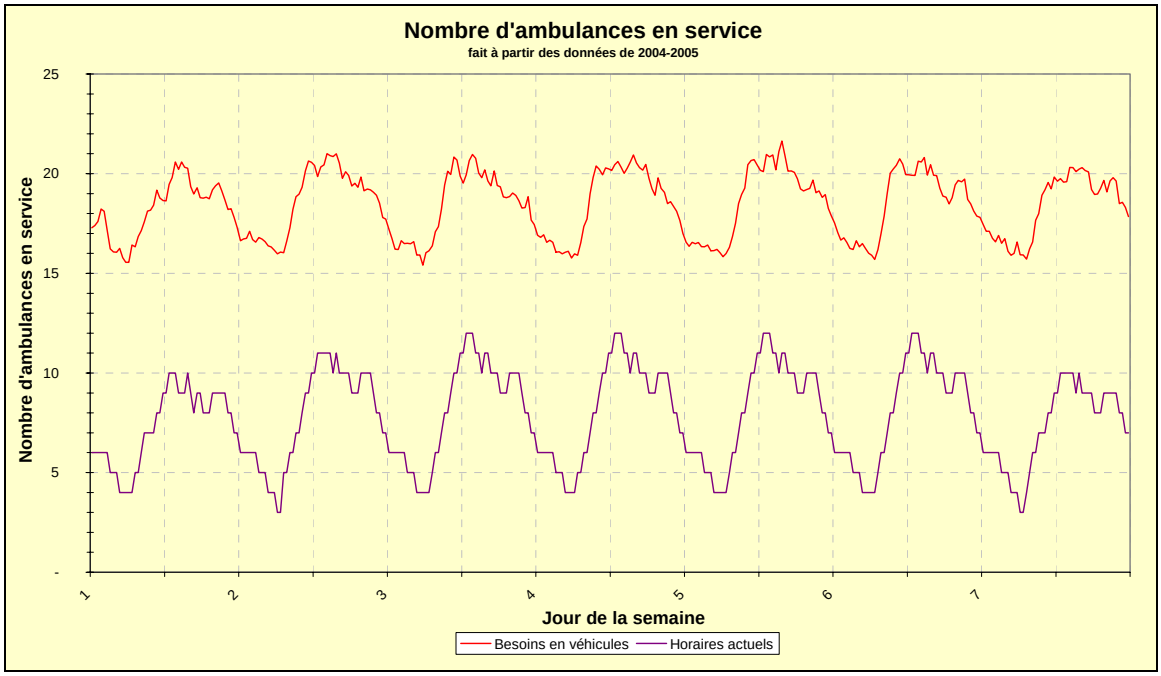
The patterns of demand over months, weeks and days allows for an understanding of when additional resources will be required.



3. Smoothing Principles: The use of smoothing principles to make demand usable. This allows for demand to become a risk management decision and not have clients be at the mercy of the sharp artifact effect of unmanaged demand.

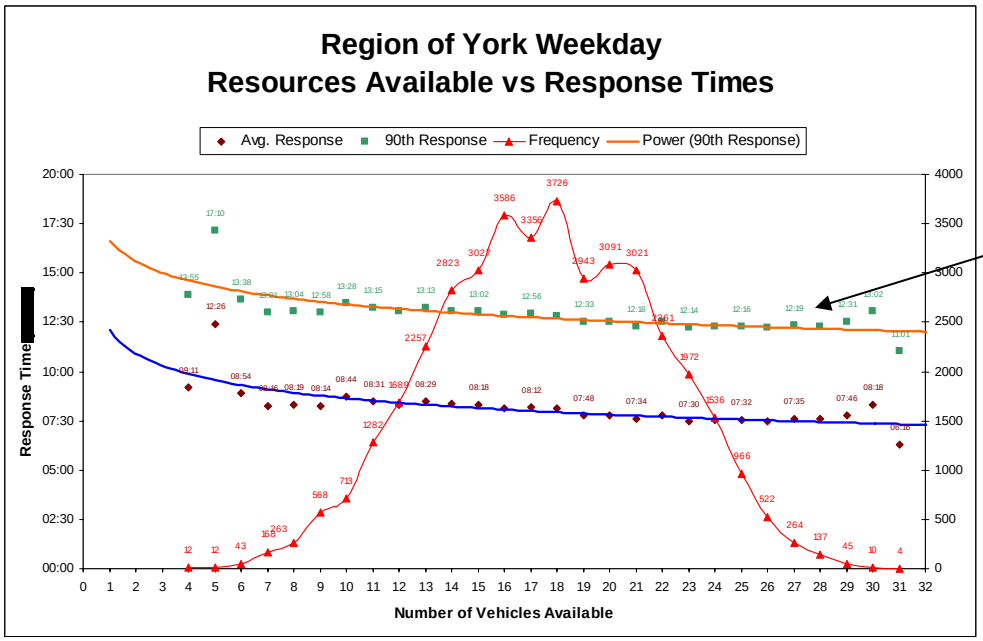
This is a technique that allows for demand to become both repetitive and useful by removing the strong and sharp changes in volume of activity that occurs when singular incidents are plotted. The goal is to understand the behavior of demand and make it a parameter of risk and thus a management decision.

Vehicles required to improve performance to 9 minute/90% standard



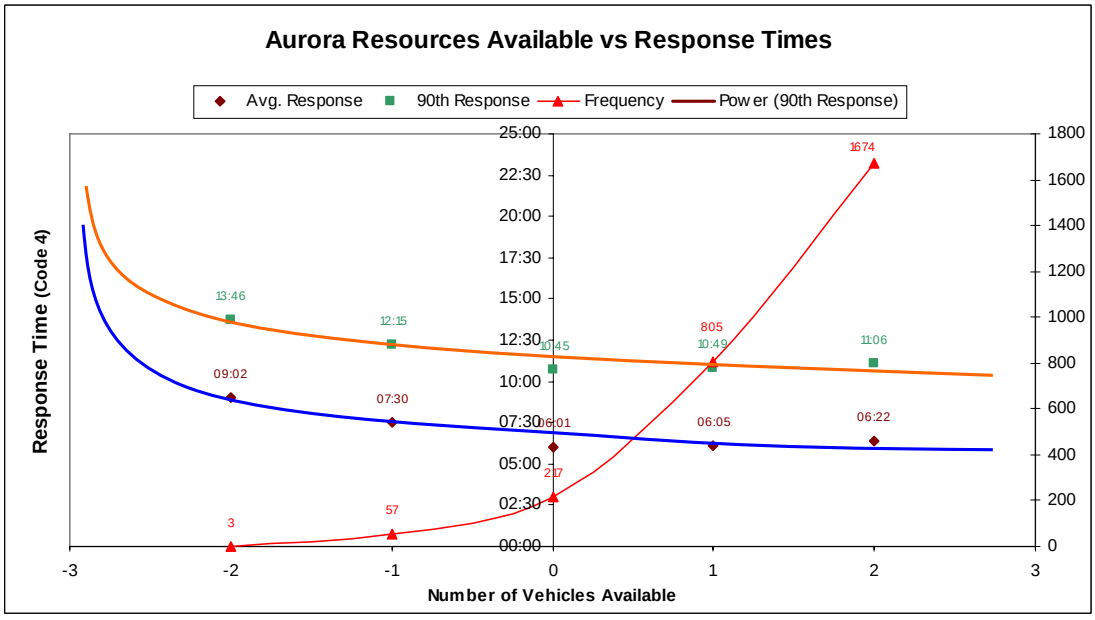
4. Observation Techniques: An observation technique used to understand how the system behaves as resources are added to the system.

This technique was developed to observe without bias the behavior of the system as resources are added. The conventional wisdom is that the more resources are added, the better the response time. We have noted that this is often not true. Thus using this technique we can maximize the cost benefit of a system.



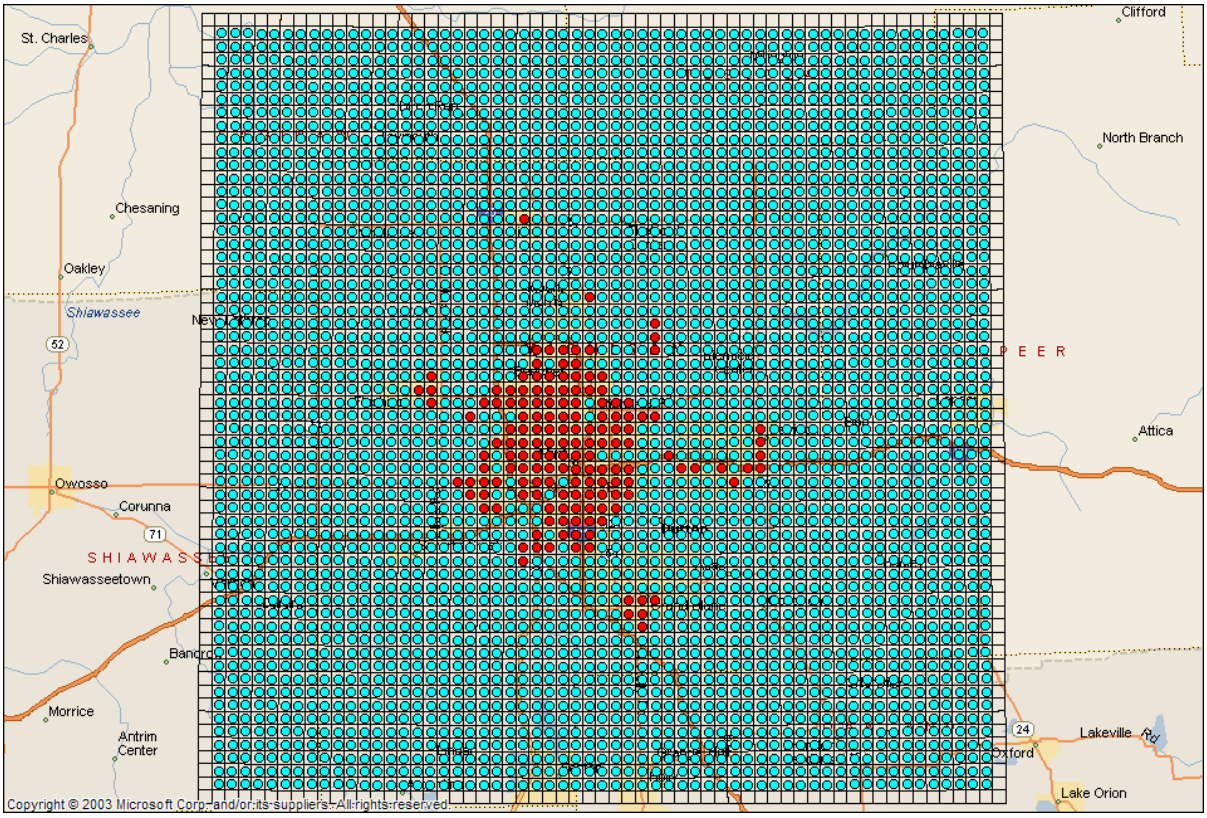
As can be seen, the response time is unimproved or marginally improved by additional resources

This technique applies to small services as well



5. Geospatial Analysis: A geospatial analysis that evaluates the performance of existing deployment plans.

This is done two fold. The first is the creation of a demand distribution in which urban and rural areas are set based on demand and not population demographics.



For any cell to be classified as *urban* (red color), the cell must have a call density of at least two calls per month based on historical data and at least half of the eight bordering cells must also have experienced two calls per month. All other grids in this example are labeled *rural* (blue color).

The grids are used to establish optimal response coverage for response times of:

- Urban Areas at 8 minutes zero seconds travel time(displayed as 8:00)
- Rural Area at 11 minutes zero seconds travel time (displayed as 11:00)

Additionally, these areas are evaluated against existing post locations for performance and suggestions are made for change.

Table 1. PostPlan90 – Level 20

Name	PolyNum	Latitude	Longitude	Clas	Count	Total	Percent
1	1979	43.01191	-83.687351	U	1062	1062	35.99%
2	1624	43.065608	-83.675077	U	540	1602	54.29%
3	1747	43.047709	-83.736446	U	217	1819	61.64%
4	2047	43.002961	-83.797814	U	195	2014	68.25%
5	2564	42.922414	-83.625983	U	113	2127	72.08%
6	1965	43.01191	-83.515519	U	109	2236	75.77%
7	1442	43.092456	-83.613709	U	99	2335	79.13%
8	2335	42.958213	-83.711898	U	82	2417	81.90%
9	1447	43.092456	-83.675077	U	73	2490	84.38%
10	1691	43.056658	-83.773267	U	49	2539	86.04%
11	862	43.181952	-83.736446	U	45	2584	87.56%
12	1971	43.01191	-83.589162	U	39	2623	88.89%
13	1924	43.02086	-83.736446	U	18	2641	89.50%
14	**2153**	**42.985061**	**-83.65053**	**U**	**18**	**2659**	**90.11%**
15	2928	42.868717	-83.748719	R	58	2717	92.07%
16	1281	43.119305	-83.810088	R	56	2773	93.97%
17	2286	42.967162	-83.834635	R	33	2806	95.09%
18	2440	42.940314	-83.552341	R	24	2830	95.90%
19	3288	42.81502	-83.822362	R	24	2854	96.71%
20	1552	43.074557	-83.515519	R	22	2876	97.46%

Note: Class U = Urban Post (8.0 minute response area)
Class R = Rural Post (11.0 minute response area)

While deployment review and modeling is scientifically based, it is not as simple as using pure mathematics to hit the "improve productivity button." This information is interpreted by experienced deployment planners and system designers to achieve a balanced and sustainable approach.

For more information about your needs, please call us at 816.431.2600.