

GIS VOLKSWAGENS

A Proposal of Modest Proportions

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Volkswagen GIS

Every year at the Natural Hazards Workshop I am dazzled by the apparent extent of duplicated, parallel effort in the production of cutting-edge, Geographic Information Systems (GIS). These systems are being developed for land use planning and hazard mitigation applications, basic zoning, hazardous materials tracking, equipment placement, and everything in between. These GIS applications appear to be "Rolls-Royce" development efforts; they will benefit only a few places (though some are very large); they are unique; they seem to require input of data *de novo*; and they involve enormous efforts of extremely advanced technologists and much specialized, ever-evolving training.

We need this work, and I would not stop it -- BUT we also need the equivalent of "Volkswagens", as a cost-effective, user-friendly, standardized technology that maximizes the efficiency of use of a basic package, by many users of all sorts, at minimal cost and with minimal training and expertise. Such a VW system should accept data from central archives (which are also the back-ups), and reduce to a minimum the number of times the same information will be digitized, etc. Like the VW automobile, once a sufficient number of these systems are in place, an after-market should quickly appear, selling modifications, add-ons, short-cuts and efficiency aids of all sorts.

The cost-effectiveness of a small investment in the intellectual capital of setting a few standards, while a sunk cost, would enable almost zero marginal costs every time another user is added, with increasingly large net and marginal benefits.

Consider the sense of everyone writing their own editing package, instead of simply getting a copy of Microsoft Word or other word processor program. In five years, the VW Basic GIS with central data support, simple up-dating and local data entry and meta-data management protocols and standards, could and should be in the same place as the current word processing standards. To make hazard mitigation work, one high-priority goal should be to make a basic "lowest-common-denominator" GIS system as widespread and well-used as word-processing and spreadsheets.

There are literally hundreds of local governments which need the information so conveniently presented in GIS systems. But small cities and towns, in both developed and developing nations, are unable to cross thresholds of funding, staffing, and data collection expense to begin their own systems. In Colorado, regional coalitions have been developed as a partial response, and other efforts are underway. But we need commitment, and a clear demonstration of the benefits available to small local governments. The benefits of modest systems are potentially enormous; the costs are the question not yet effectively addressed, because there has not yet been a sufficient commitment to address this specific need, and to involve a coalition of the relevant organizations. Efforts toward similar or compatible goals are underway right now by the Colorado Advanced Technology Institute, American Planning Association, International City Management Association, Urban and Regional Information Systems Association, and dozens of others.

The time is ripe for a compelling demonstration of the uses and charms of GIS, as a tool for local governments and citizens, especially in the rural and lower-revenue areas. And therefore, the time is ripe for a broad-based coalition to cooperate in the application and development of the Volkswagen system, to be used and developed in the process of use in pilot projects.

This is not a technical challenge. Treating this as a technical issue gets the wrong answer if the question is, "How do we maximize the use of GIS for basic land use planning, hazard mitigation, and ancillary purposes such as public participation and planning coordination between the public and private sectors?" If a sufficient number of agencies and governments started right now using an "obsolete" system, that package would nevertheless become the basis for the most cost-effective and useable applications across the U.S. within a very short time. We could make the market work for us, instead of letting "out of control" technological diversification defeat efforts to "keep up".

Equally importantly, even without any change at all, if topography, available geologic hazards information, lifelines, basic jurisdictional information, and census data were all available and ready to be supported by a central service office, with sufficient distribution that bugs would be quickly caught, diagnosed, and remedied, we would have

made a huge leap in the real-world application of the technology. Almost any large coalition of agencies with a university affiliate (to supply computer science, geography, and public administration students to support the users and provide centralized archiving and data distribution) should be able to achieve a terrific effect, if there were adequate assurances of a reasonable duration for the effort. Nothing is permanent, but a strong commitment for a few years seems a reasonable expectation to support the investment. The cost of this is utterly trivial compared to the \$20 Billion a year estimated costs of data processing alone in the current anarchic situation. No one knows much of that astounding amount is unnecessarily duplication, which could have been spent on hazard mitigation instead?

The local role in hazard mitigation is central and increasing, and the least-equipped jurisdictions may well have the highest cost-benefit ratios from application of the new system, since their marginal benefits would be so high. But the states are weakening in mitigation funding, and perhaps in planning and land use analysis in general, even though these are desperately needed for risk reduction, pre-disaster planning and planning for recovery, as well as for the whole range of land use considerations. It is always cheaper to "do it right the first time", and it is clear that the process of land use planning and hazard mitigation can itself be an important part of community-building (though without sufficient citizen involvement, the results can be just the opposite). We are currently losing about \$1 billion a week, to hazards, and no one has ventured a guess yet as to the waste of funds and opportunity created by neglect of all sorts of risks and better ideas, or neglect of planning in any form, but that number would be horrifying.

Here is how I would compare the two approaches:

CRUDE COMPARISON CHART

ROLLS-ROYCE MODEL

VOLKSWAGEN MODEL

Cost-effectiveness not usually directly considered; marginal benefits a research question

Cost-effectiveness maximized, very high marginal benefits of investment

New technology, limited access

Well-understood, easy access

Cost not dominant consideration

Cost is major factor for users; should be cheap!

Revisions often major, very specialized

Revisions frequent, often small, often generalized

Usually novel processing, novel data, so per se not easily shared

Deliberately not novel processing, data tailored by users

Inaccessible to others

Very widely accessible

No market effects; instead, competing with each other

Intend major market effects, create demand for products

Investment risky, often a write-off as research, no market to unload system

Investment by users minimal, easy to recoup some capital expenses if necessary

No public ownership or access practical; few "freebies"

Public ownership and access is intended; many applications

Repairs and maintenance inherently problematic

Repairs and maintenance widely understood, easily learned

Always in progress, seldom applied widely, usually only demonstrations?

Ready to run ASAP, self-promoting and gratifying to use

Replicability limited

Widespread replication of almost all of system

Back-ups by self only, with ad hoc centralization and variable security

Back-ups easy, archived in central facility at low cost and with high security

"Perfected" someday?

Workable now!

GIS systems are hardly a panacea, but they do offer very important attractions and capacities for involvement of citizens, given adequate access, and for dramatically improved capacity to literally visualize the situations that are identified, whether real or proposed. That in turn offers powerful assistance in getting the most cost-effective government services, and the most desirable results. The question is not what is technically possible on the cutting edge; the question is how to spread the tool's benefits with efficiency and ease of use. I am convinced that the answers are available -- perhaps absurdly easily -- if we demonstrate commitment.

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