



For the past two years, a grassroots effort has been under way to garner support for folks seeking to develop RTN in their local regions. An RTN covers not only as wide geographic area, but may also encompass many stakeholders, communications systems, bureaucratic tangles, and varying depths of understanding of the subject; all can be hurdles and challenges.



Using the RTN as an amenity for Resource and Asset Management. Henry Chen, Asset Management engineer for Seattle Public Utilities checks the network development status map for the rapidly expanding regional RTN.

Anyone who has developed an RTN can cite their own particular “points of pain”, but there are a number of these “challenges” that have been fairly universal to each network developed. On-Grid seeks to reduce that pain and help folks tap resources and expertise that for the most part already exist. Most of the networks developed overseas benefitted from national assistance at some level even if this assistance was not financial.

There are a number of other industries already deeply involved in developing infrastructure, and competing for valuable resources in doing so (construction, agriculture, academia, telecommunications...) Forming somewhat organically across the U.S. (and world) these infrastructure networks often only serve best the needs of the immediate stakeholders

RTN-101: On-Grid – An Initiative in Support of RTN Development (Part 4)

(and often only with a perfunctory nod to the surveying industry.)

The surveying industry, at the very least, should have a say in how these valuable resources are developed and implemented... perhaps even lead the way. There are a few not-to-be-

mentioned “waves of change” that have slipped past us in recent decades...

So what is On-Grid? And what is with the strange name? In short, it is call for some direction in development of this new “utility”, a direction guided in part by surveyors...

>> By Gavin Schrock, LS



Reference Station at West Seattle Reservoir: originally established for plate tectonic studies and resources mapping, it was added to the state network with no modifications needed.

Grid” might seem a bit off subject to surveyors for an initiative name (and maybe even seem insulting to geodesists), it has proven effective in catching the attention of non-survey types (lets not get hung up on this one).

The key point that needs to be made to folks is that **high precision is an affordable reality.**

Sometimes parties are reluctant to invest time and money in RTN because they keep hearing about existing augmentation systems. What they do not understand is that these systems only provide lower precision real-time positioning. Yes these systems may be on the national and worldwide level (e.g., NDGPS, HaNDGPS, WAAS, PPP) but these will not likely ever be able to reach the precision thresholds required for engineering-grade applications.

Local RTN should not be viewed as a substitute or competition for the national and global applications, on the contrary, local action can contribute CORS data



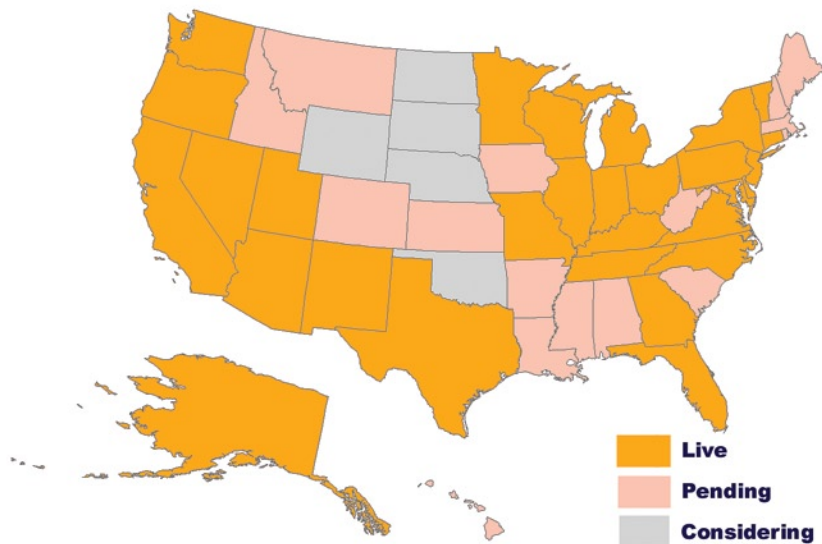
ON-GRID

To develop, on the national level, a program to assist locally or regionally driven initiatives in the establishment, maintenance, and operation of real-time GPS infrastructure networks to serve the widest possible range of public and private sector interests.

Currently there are no national programs to support development of local real-time networks.

A key point of pain in seeking to develop an RTN is convincing approving authorities (and particularly those holding the purse strings) that an RTN is doable, affordable, viable, and will make them all look like heroes.

To achieve such a goal, we need to do some outreach to a lot of folks who are not surveyors, or who know absolutely nothing of this subject (even those in our own ranks). They need to understand some fundamental concepts (and be lobbied) before any proposal moves forward. To this end, two years' worth of correspondence between the early On-Grid proponents had to be distilled down into a sort of primer, or



While there has been at least some development or dialogue concerning establishment of RTN in nearly every US state, a lot of work and support will be needed to broaden the coverage of these networks. (Source: Web search Sept. 2006)

white paper on the subject. Recently one has been posted to: http://www.aagsmo.org/textfiles/OnGrid_White-Paper42806B.pdf. *The white paper is a bit dry and long winded by design, so we'll try to cover the highlights in this article.*

It seems that even if an idea has not been fully developed, a catchy name might make it seem like it is. While “On

to, and by extension the success of such programs.

Others have asked “if this is so cool, how come the federal government isn't doing this for us?” Should they? Could they? That is not what On-Grid is seeking; we'd have to be realistic in expectations and the expectation is that it could never happen. Private, local and regional

public sector and public/private cooperatives are doing a fine job in developing RTN without interference or competition from the federal level. But there are federal resources, particularly in the areas of policy, standards, geodesy and other expertise that could greatly benefit RTN developers and bring this valuable utility to a wider region of our country.

A role in a proposed On-Grid program perfectly suited for a federal agency, the National Geodetic Survey could be; administration of any federal level elements of the program, standards, guidelines, geodesy support, and in the case of RTN the establishment of reference coordinates, geodetic monitoring, and perhaps even as broker of data streams between parties. *Note: the NGS has already stated that their desire is not to go into the corrections business, but to support the rise of real-time within their realm of influence, charter, and limited funding.*

The NGS has staff assigned to the subject, and so far all On-Grid materials have been reviewed and met with great enthusiasm. A recent white paper by the NGS on the subject titled *“The New RTK - Changing Techniques for GPS Surveying in the USA” - William Henning*, NGS can be found in the journal of the NSPS “Surveying and Land Information Science - Vol 66, Number 2, 2006.

What Would a Program Look Like?

It would likely be an amalgam of initiative elements, some requiring local action from associations and industry (like outreach, education, and resource sharing), some at the national association and industry levels, and some at the federal level.

What is easier to characterize is what On-Grid should NOT become:

- No additional rules and restrictions
- No big-budget federal program
- No resources for public sector initiatives only
- No proprietary solutions

Instead, On-Grid seeks:

- Resources
- Expertise
- Policy assistance
- Cooperative efforts

As you can see, few of these involve any potential funding needs. A number of these elements look like good “missions” for professional associations or industry groups.

CHALLENGES FACING RTN DEVELOPERS

Local Information Technology Concerns (the reference stations are 24/7 sensors sending data alien to most IT folks).

Broader acceptance of NTRIP protocol (these networks transmit and receive the majority of their data via an Internet Protocol unfamiliar to many).

Misinterpreted as a security risk (are centimeter-grade precisions any more of a security risk than the readily available meter-grade options or something like Google Earth? You’d be surprised how many middle managers get freaked about this.)

High Precision little discussed within the realm of national GNSS policy. Most discussion around GNSS revolves around military and lower grade uses like recreation and navigation.

Lack of local geodesy expertise.

Duplicity of effort and data sharing efforts (there are many reference stations established with public funds that can very easily provide raw data for local RTN, usually only policy stands in the way).

Few academic studies or grant opportunities (overseas, where RTN have existed longer there has been a lot more research and publications).

Few cost-benefit examples, agreement boilerplates or case studies.

Few publications. (It has often been said that if one wanted to open, say, a pet grooming business, there would be a federal publication on the subject. For RTN... Nada, nothing, zilch...)

Approving authorities are going to take many years to get comfortable with the subject of RTN. (This is a new subject in the U.S. and benefits often are not apparent until an RTN is up and running and folks can demonstrate them.)

Not widely viewed as a public amenity. (There are great benefits beyond surveying; scientific, public safety, navigation, timing...)

ON-GRID OBJECTIVES

White papers, position papers, and/or federal publications on the subject.

Education, outreach, position papers, and/or federal publication on the subject.

An official position paper from a federal agency like Homeland Security. (An irony is that RTN have actually been utilized in DHS exercises. The benefits most certainly outweigh any highly unlikely risks.)

On-Grid seeks (and has recently gained) a seat at the table in such forums.

Education, white papers, guidelines and standards (good role for NGS).

National policy and mechanism for raw data stream brokering (NGS has a proposal to offer raw data from a grid of existing CORS for RTN use).

Education of the granting agencies and foundations.

Those exist, but no one has the resources to compile and publish.

Again, no one has the resources to compile and publish (and I’m sure that folks are tired of reading my diatribes on the subject).

Sometimes upper management is seeking those three magic words from a higher authority: “This is cool.” (Don’t laugh, it is often this simple.)

Short of classifying RTN as a Utility (then it might get regulated) outreach and education are needed.



Left: Typical Reference Station in the National Network in Japan

Below: On-Grid seeks to foster the development of RTN over wider regions of our country, enabling rapid mobility for the surveyor.



What Steps Have Been Taken? 2005

On-Grid participants (mainly those who currently administer RTN and those seeking to develop new ones) corresponded via e-mail and meetings at association and industry conferences to outline goals and objectives for the drafting of an initial white paper.

April 2005

Orlando ACSM Conference At the meeting of the Joint Government Affairs Committee (JGAC) of the ACSM and NSPS, the white paper for On-Grid was presented. JGAC chair John Matonich stated, "I like where this proposal is at in its development; an early call for support." The JGAC later sent a motion to the boards of both ACSM and NSPS to support the development of an initiative, motions approved by both and several member organizations.

September 2005 & 2006

Civil Global Positioning System Service Interface Committee (CGSIC) Annual Meetings On-Grid was presented as part of the NGS CORS Forum. Most key GNSS policy makers attend these sessions, a great networking opportunity.

January 2006

U.S Chamber of Commerce Space (Washington, D.C.) Enterprise Council Media Day General reaction: "You can actually get those kinds of precisions? Wow!"

February 2006

International NTRIP Symposium (Frankfurt, Germany) The country with the most experience with RTN; expertise and information sought on the types of resources that are available for RTN developers in Germany and other countries.

October 2006

PNT (Position Navigation and Timing) Architecture Group (Washington, D.C.) This is a federal group tasked with framing national GPS policy for the future for all federal departments. Analysts and economists on the PNT panel were mostly unaware of the reality and potential of high-precision positioning like that made possible via RTN. The response was overwhelmingly positive and further dialogue is being sought.

Ongoing

Local On-Grid participants have been contacting their federal representatives

and staffers. Some are entertaining the idea of proposing a national program.

What Can You Do to Help?

The On-Grid initiative will continue as a grass roots effort to develop a national program, or lend support to programs that seek to provide resources needed to achieve the same goals. On-Grid participants have been very effective in articulating their needs, but are somewhat clueless as how to frame a national program.

If you have experience in such matters or connections with folks that do, then by all means get in the On-Grid loop (schrockg@comcast.net). This is a subject that is ripe for local and national association dialogue and action, a wonderful opportunity for surveyors to play a leading role in what will certainly drive tremendous change for our industry. *AS*

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