

## **Quickscan Innovativeness Portfolio RGI**

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**Summary**

RGI has succeeded, in a brief period of time, in building up a large and coherent network consisting of collaborative research and education institutes, public organisations and companies, with a portfolio of eighty projects and innovation pilots. There is high expectation with respect to the innovativeness of this portfolio, because a relatively large number of projects fulfils qualitative conditions regarding speed, distinction and revolutionarity. To further strengthen the innovativeness of the portfolio it is important to support the innovative leaders. Areas of interest for support are, among others, knowledge protection, investments, business plans, cooperation with other leaders, and new product-market combinations. The Communities of Practice of RGI can be fine-tuned to address these areas, but there is also a need to focus beyond the existing consortia.

## Conclusions and recommendations

From the qualitative analysis of preselected projects from the portfolio of RGI, a picture emerges showing a spread of expected innovativeness ranging from poor innovativeness (score -) to excellent innovativeness (score ++)<sup>1</sup>. As the projects were preselected on their scoreability, it may also be concluded that the projects with the highest scores were the projects best scoring on innovativeness in the entire portfolio. For innovativeness, a definition has been used that takes commercial success of products, processes and services as a starting point by scoring on the prognostic dimensions speed, distinction and revolutionarity<sup>2</sup>.

No new RGI tenders will be published and the financial means of RGI have largely been allocated. Therefore, if RGI wants to optimise the innovativeness of the portfolio, it is wise to focus the attention to the so-called low-hanging fruit, in other words to projects that, with a relatively small effort, can indeed yield innovative products and services. First, this concerns the projects with a ++ score, and second the projects with a + score.

There are six ++ projects. That is a large share, provided these projects do indeed fulfil their promise. In that case 8% of the projects will show market success. In industry, it is common that only a few percent of innovation projects actually lead to profit. This is also the case, for example, with IOP projects and projects of the STW technology foundation<sup>3</sup>. Comparable data from other BSIK programs<sup>4</sup> are unknown, but are expected to indicate less or equal levels of innovativeness.

Other elements in the ++ score, in addition to the three general dimensions mentioned above, are (in the order of RGI project numbers):

- Geowindows (RGI-006): *Geowindow 'Red' already connected to clients*
- Population database (RGI-019): *Result adopted by market leader Bridgis*
- Mutatis Mutandis (RGI-027): *Efficient solution of large problem*
- Fire Service 100% mobile (RGI-123): *Has won an innovation reward and delivered a turn-key product*
- Real time inwinning (RGI-147): *Has already led to the realisation of a company 'Geocopter' to market the results*
- Geoweek (RGI-164): *Has realised a working connection with a popular television program*

Now it is a matter of utilizing the strong elements of the portfolio. This does not mean 'Picking the Winners', but instead means 'Backing the winners': only by the efforts of his helpers can a cycling champion win the Tour the France. For the RGI portfolio this means for instance help with entrepreneurship, help in finding investors and partners, help with knowledge protection and help with the identification of new product-market combinations through exploration of uncharted terrain and through realising cross fertilization and cross functionality between projects within and outside RGI.

*Geowindows Red must consolidate and transfer its success to other Geowindow colours. Bridgis has every chance to remain market leader in The Netherlands – in addition it could try a serious move towards conquering the EU. Mutatis Mutandis should try to cash in on its golden opportunity. Support with intellectual property protection and entrepreneurship may be an important factor to make that happen. Fire Service 100% mobile should expand and retain focus and speed. Geocopter should grow, and should not go into bankruptcy because of unanticipated competition. Geoweek is a communication project and not necessarily aimed at market innovation, but its link with the youth television program Dropzone offers enormous advantages that can turn into profit.*

<sup>1</sup> Three projects could not be scored

<sup>2</sup> See paragraph 'Background' for further explanation

<sup>3</sup> IOP: National research program aimed at innovation (Ministry of Economic Affairs); STW: National Technology Research Council

<sup>4</sup> BSIK: National Knowledge Infrastructure Investment Program

There are thirteen + projects. Among them are award winners Geofarmer (RGI-004, RGI-176) and 3D Topography (RGI-011), plus also Fundamental Maps (RGI-002), Virtual Reality (RGI-013), Traffic Expectation (RGI-102), Cyclocity (RGI-129), Sewage systems (RGI-162), Sensors as data sources (RGI-189), The Climate Game (RGI-208), Usable Mobile Maps (RGI-233), Open Safety Platform (RGI-239) and Google DURP (RGI-314). There are promising opportunities for combination, such as the combination of Sewage Systems with Geowindows 'Black'.

Regarding these + projects, similar efforts can be made as in the case of the ++ projects, albeit at a lower level. In some cases, + projects and others can be coupled to ++ projects to create a winning combination, as long as the danger of introducing sluggishness is dealt with. In the sub theme education, for instance, a combination seems logical between Geoweek (with Dropzone), Simlandscape, the Climate Game and Geofort. In the sub theme Consumers, synergies are possible between Cyclocity, De Digital Dowsing Rod and Usable Mobile Maps. This triplet can in turn be coupled to high scoring projects from the theme Spatial Planning, such as Fundamental Maps, Geofarmer, Virtual reality, 3D Topography and Google DURP. In other themes similar doublets and triplets can lead to added value, also by crossing the boundaries of themes.

The National Geo Information Infrastructure theme (NGII) is a leading and coherent core theme of RGI. It is conditional to innovation, but is not primarily aimed at direct commercial success itself. Nevertheless, NGII shows three innovative winners. The activities within NGII closely match the demand of industry to realise more transparency in the public geo information infrastructure. As no structure can be developed without pilot projects, it is commendable that NGII contains pilot projects as well. Some projects can profit from more attention to knowledge protection, as a fundamental condition for value proposition. Maintenance of NGII is an important point of attention which is not satisfactorily covered in all projects.

Risk management is an important cluster within the theme Public Order and Safety (OOV). The theme exhibits a solid balance between offence, midfield and defence, and has two scorers. Chances for rapid success and expansion in this theme are considerable. However, it remains important to pay attention to competition from other sectors, such as spin-off from military developments.

The Spatial Planning theme (ROI) contains two innovative clusters Geofarmer and DURP. The latter offers a solid stronghold with the equally named governmental program that resulted from the Spatial Planning Law that comes into action in 2008, requiring transparency of geo information. Connection with the large and successful agribusiness sector offer many chances, as does the connection to small and growing sectors such as gaming. ROI projects still are disconnected from each other, offering interesting chances for improved synergy. The ROI theme is also closely tied to the federal program LUMOS, providing a strong base.

The theme of Consumers and Students (COL) is richly filled with projects. Two clusters, of consumer oriented projects and of educational projects, are evident. There is one winner in COL. To truly turn COL projects into success there is a need for ambitious entrepreneurship, with many commercial opportunities also outside the focus of GIS.

The powerful network of the RGI-consortium will no doubt add to its success. In addition, RGI has created Communities of Practice within the themes. Based on this Quickscan, and in order to stimulate innovativeness, it is suggested to, above all, bring the winners together and not necessarily stay within the thematic boundaries. That is also in line with the original matrix approach. Within such communities the goal is to combine each others strengths, to solve common problems and to find new joined markets and partners. In addition there is a challenge to invite completely new sectors and partners such as Defence, National Statistics Bureau, Customs, car lease companies, leisure business, container shipping, courier services, residential lighting, air traffic control, etc. In other words, to get a head start, it is important to on the one hand narrow the network and focus on excellence within the communities of practice, in other words to focus on the winners. On the other hand, looking at expansion, it is important to widen the network and to engage additional partners from outside the consortium. Obviously, a lot is

being done already in this respect, such as the collaboration between the BSIK projects dubbed 'Eight for Space'. However there are additional opportunities ready to be grabbed.

The Space for Geo – Information program is designed to stimulate innovation. Whether projects will actually lead to innovation is a question to which a definitive answer can only be given in retrospect. It would therefore be wise to support and monitor the projects for a considerable period of time, at least ten years. Innovation is a matter of speed, but also a matter of perseverance.

In a relatively short period of time, RGI has built a large and coherent public – private network with a balanced portfolio of projects that gives rise to a high expectation of innovativeness. A balanced portfolio is characterized by a balance between large and small projects, slow and fast projects, projects with high risk and projects with low risk, and by a cohesive thematic spread. Such a balance has been well realized within the RGI-portfolio. Also, it is remarkable that a number of small projects display a high expectation of innovativeness, in line with the qualification 'innovation pilots' that RGI has labelled them with from the start.

Although the broad consortium covers the matter from many angles, there are still numerous other perspectives that have not been covered by the projects. This offers a lot of space for expansion into new sectors and for new partnerships. To foster innovative success it is necessary for this space to be used.

## **Background**

The BSIK-program 'Space for Geo – Information (RGI)' started in 2004 with an investment of 20 million Euro from the federal government to bring more structure and functionality in spatial information in The Netherlands. Industry, science, government and NGO's are being stimulated by the program to make databases and systems (GIS: Geographical Information Systems) more transparent and available and to put them to good public and private use. In doing so, RGI has built a large and active multifaceted network that is well connected, both nationally and internationally. All project participants are also members of the RGI consortium. This consortium has grown to 250 members. Through tenders, the available financial means have been allocated to many tens of projects. Together, these projects constitute the portfolio of the RGI program. The program has a matrix shape. The National Geo-Information Infrastructure (NGII) and Science provide the basis, whereas the columns consist of the themes Public Order and Safety (OOV), Spatial Planning (ROI) and Consumers and Students (COL).

Halfway 2007 the 'mid-term review' is planned. Within this framework, several activities are being carried out under the direction of RGI, among which are two Quickscans, one on economy and the other innovation. The leading question is what RGI has produced so far and will produce in the future, given the program and given the context in which this program is being executed. RGI has asked Prisma & Partners to carry out, within the boundaries of available time and budget, an independent Quickscan of the innovativeness of the portfolio. The Quickscan is part of the formal evaluation and will in this respect be presented to the international review committee. Also, the Quickscan is aimed at supporting RGI itself in realising its goals.

## **Analytic framework and approach**

### ***Innovativeness***

Innovation knows many definitions. It concerns realizing market success with new products, processes and services with the support knowledge. That knowledge does not necessarily have to be new. More than 90% of successful innovations have been realized with combinations of existing products, processes, services and knowledge. In other words, it is not a condition to develop new knowledge, and therefore scientific research is different from innovation. Innovation is the effect of innovating. Success largely depends on 1) the speed with which a new development brings added value in society; 2) the distinction between that development and others and 3) the effect that is gained. Also 'revolutionarity' plays an important role: the extent to which a project results in a leap of change compared to stepwise innovation.

The larger the speed, the distinction and the revolutionarity, and the greater the effect, the bigger the innovativeness. This definition brings innovativeness within the scope of measurement and influence and emphasizes utilization<sup>5</sup>. This is of importance for the Quickscan and creates a basis for the analytic framework.

### ***Speed***

The longer an innovation path is, the higher the cost and the later the instance that profit can be made. In the meantime the world keeps turning, with the risk of the competition commercialising sooner. A few months of additional development can thus create the difference between leaders and laggards.

Therefore, analyzing the projects in terms of expected speed, offers an important measure of expected innovativeness. Projects can for instance lose speed by:

- Complex management structure
- Large amount of aspects and components
- Cumbersome conditions

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<sup>5</sup> Groen, Vasbinder and van de Linde: To Innovate: Concepts, practical experience, perspectives. Spectrum (2006) In Dutch.

- Slow realisation of necessary standards and licenses
- Complicated intellectual property ramifications

### ***Distinction***

Distinction is needed because The Netherlands is a small player in the global world. Apart from a handful of multinationals, Dutch companies cannot, in terms of size, compete with large players abroad. To be successful despite of this, Dutch companies must focus on specific power and unique strength and focus on national key areas and regional specialisations. In this way they can take a significant lead. Qualitative analysis of projects and the portfolio regarding distinctiveness therefore offers an important measure of expected innovativeness. Also, this analysis covers the demand of RGI to take the context into account in the Quickscan. Distinction can play a role at many levels, for instance:

- Regions
- Clusters
- Sectors
- Key Areas
- Products, processes, services and technologies
- Combinations
- Entrepreneurship

### ***(R)evolutionarity***

Most innovations are evolutionary, meaning that existing products, processes and services are improved in a stepwise manner by optimizing parts. The larger such steps, the more revolutionary the innovation. Revolutionary innovations can reach tremendous effects. Analysis of revolutionarity of projects and of the portfolio therefore is an important measure of expected innovativeness. (R)evolutionarity plays a role among others regarding:

- The problem to be solved
- The opportunity to be created
- Size and development of new markets
- Extent to which important roadblocks can be eliminated
- Extent to which new resources can be disclosed

### ***Scope of the Quickscan***

Innovativeness, in the definition of this Quickscan, is determined by speed, distinction revolutionarity and effect. However, the effect can only be measured after commercialisation. Therefore, the effect cannot yet be measured for projects and the portfolio of RGI. Therefore we will take a project as being more innovative the higher its qualitative score on the three factors speed, distinction and revolutionarity. The Quickscan Innovativeness, as a result, is an objective qualitative assessment, mostly based on available documentation, of selected projects in the current RGI portfolio. This analysis entails:

- A qualitative analysis of selected projects based on the three mentioned dimensions for innovativeness
- An indication as to how selected projects may score better within two years
- The meaning of the project scores within the perspective of the entire portfolio in order for RGI to gain insight in the overall balance and focus
- An advise at program level to optimize the portfolio's innovative aim

### ***Project selection***

The total portfolio of RGI consists of about eighty projects. That is too many to fit in the framework of the Quickscan. Moreover, not all projects are aimed at innovation, that is to say not as defined in the Quickscan, with market success as the bottom line. It has no use to assess innovativeness of projects if they are not aimed at it. Also, a number of projects have been started only recently, and therefore their analysis is more difficult than that of longer running projects and of which progress reports and monitoring statements are available. Therefore RGI has made a selection of about thirty projects for the Quickscan. Leading question in this selection was whether the projects were assessable in terms of speed, distinction and (r)evolutionarity. Twelve of the thirty

selected projects are also to be analysed in the Economical Quickscan, offering the opportunity to compare and combine the outcome of both independent Quickscans for these projects (Appendix C).

*In other words, the Quickscan works with a pre selection of relevant projects. Obviously, this does not mean that unselected projects are not innovative, especially not when a broader definition of innovation is used, which is common in RGI. Innovativeness for instance can also be attributed to new public-private collaborative arrangements and system innovations, albeit without direct market success. RGI has many goals concerning society, economy, science and innovation. In this, RGI chooses to play a catalytic role. As an example, some projects take renewal of policy and management perspectives as a top priority, and innovation as a side path. Such projects were not assessed in this Quickscan or if they were, they did not score very high. The Quickscan is only a brief look at innovativeness. The overall effect of RGI is much broader and stretches way beyond this Quickscan. The Mid Term Review that concerns all goals of the entire program is the sole responsibility of the Mid Term Review Committee.*

The Quickscan innovativeness is more specifically aimed at the future than at the past. It offers a perspective for the Mid Term Review Committee, but stays away from its assessment responsibility and is also meant to support RGI itself in optimizing the program.

### **Other approach aspects**

The required objectivity of the assessment of innovativeness plus the requested speed of assessment have been leading in the approach. In terms of source material, the Quickscan is restricted to existing and available (electronic) documentation. At the request of RGI, no personal contact was made with members of project consortia. The draft results were presented to an advisory council of which the composition was based on consultation between RGI and Prisma & Partners. The advisory council consisted of six members (appendix A). The remarks of the advisory council have been taken care of in this final report.

This report is the integral translation of a preceding Dutch version that was presented to the board of RGI.

## The selected projects

RGI provided digital documentation of 33 selected projects on three CD's. These are listed in Table 1 in order of the RGI project numbering system.

**Table 1. The projects selected by RGI for the Quickscan Innovativeness.**

Number and name RGI-project	Category	Cost (Euro)	Number of partners
RGI-001 Risk management	OOV	1.975.039	11
RGI-002 Fundamental maps	ROI	1.655.828	9
RGI-004 Geofarmer	ROI	2.292.495	12
RGI-006 Geowindows	NGII	2.671.295	13
RGI-011 3D Topography	NGII	1.651.086	8
RGI-013 Virtual Reality	ROI	1.337.084	5
RGI 014 NODC-i	NGII	2.161.393	9
RGI-019 Population database	NGII	89.500	4
RGI-022 EduGIS	COL	1.354.195	10
RGI-024 GEOGOV	COL	1.014.820	3
RGI 027 Mutatis Mutandis	NGII	1.849.312	14
RGI-101 Space to play with Simlandscape	ROI	496.724	4
RGI 102 Traffic expectation	COL	498.541	4
RGI-116 Scouting innovations GEOstandards	NGII	939.675	9
RGI-117 Geo data, from provision to access	NGII	422.456	10
RGI-123 Fire service 100% mobile	OOV	1.091.281	6
RGI-128 Geo information for risk prevention	OOV	482.660	12
RGI-129 CycloCity	COL	124.500	2
RGI-147 Real-time inwinning	OOV	100.000	3
RGI-156 Digital Dowsing Rod	COL	499.200	9
RGI-162 Sewage systems	NGII	435.062	13
RGI-164 Geoweek	COL	744.245	30
RGI-166 Archeological pre research	NGII	202.007	7
RGI-173 Sense of the City	COL	113.000	5
RGI-176 GeoFarmer	ROI	194.945	4
RGI-180 Market research DURP Portal	ROI	50.000	5
RGI-189 Sensors as data sources	NGII	490.735	10
RGI-208 The Climate Game	COL	497.664	5
RGI-233 Usable Mobile Maps	COL	884.326	8
RGI-239 Open safety Platform	OOV	889.306	10
RGI-254 LUMOSpro	ROI	1.048,285	10
RGI-314 Google DURP	ROI	79.800	1
RGI-330 Innovative Geo Education	COL	78.097	5

Together these projects present about half of the RGI budget. The RGI number indicates the tender in which they were generated. Projects starting with a 0 originate from the first tender. Projects with a 1 or 2 originate from the second tender. Projects with a 3 originate from the third tender. The column 'category' divides the projects in one of the four RGI themes: National Geo-Information Infrastructure (NGII), Public Order & Safety (OOV), Spatial Planning (ROI) and Consumers & Students (COL). An effort has been made for an even balance of selected projects over these four themes (Figure 1).

The indicated cost is the total cost per project in Euro as indicated in the project proposal, excluding VAT. Allocated budget can differ from cost figures in the proposal. The fourth column of Table 1 indicates the number of members in the consortia.

The cost data of project RGI-180 Market research Google DURP was unavailable. As qualified 'top-up' project, the cost was estimated at 50.000 Euro. Together with RGI-314 Google DURP (a so-called innovation pilot) and the DURP basis project, that runs independent of RGI, it forms one entity. The DURP basis projects is not documented in the RGI administration, but DURP's own website provides much insight into the project.

The electronic file of the project RGI-254 LUMOSpro turned out to exhibit little information. At request RGI provided hard copies of RGI-254. Regarding LUMOS a situation similar to that of DURP exists: it is an independent basic program with some projects within the RGI framework. LUMOS also has an informative website that has been taken into account in the assessment.

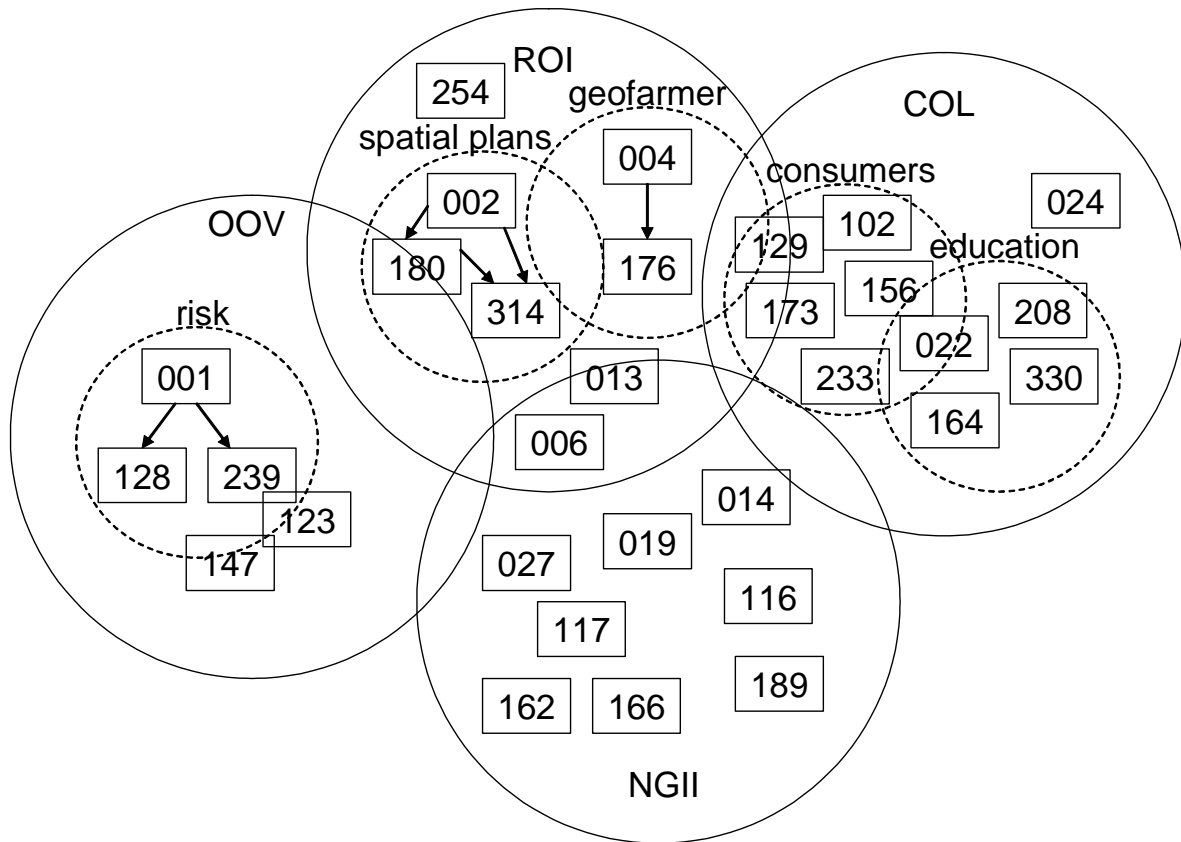


Figure 1. Schematic representation of the distribution of selected projects over themes (solid circles) and the clusters within themes (dotted circles).

**Members of the business platform  
Geo-Information BGI (April 1 2007)**

Aerodata International Surveys  
 Ingenieursbureau BCC  
 Arcadis Ruimtelijke Informatie  
 Landmark  
 Atlis Informatie Systemen  
 LNR Globalcom  
 ESRI Nederland  
 Autodesk  
 LogicaCMG  
 Bentley Systems Netherlands BV  
 MapInfo Benelux  
 Bridgis  
 Navteq  
 Capgemini  
 NedGraphics  
 Deloitte  
 Oracle Nederland  
 ESRI Nederland  
 Oranjewoud  
 Eurosense  
 Syncera Geodata  
 ECORYS Vastgoed  
 Realworld Systems  
 Facto/ 06-GPS  
 TeleAtlas  
 Falkplan-Andes  
 Tensing  
 Fugro Inpark  
 TNO Bouw en Ondergrond  
 Geodan  
 Transfer Solutions  
 Getronics Pinkocade  
 Twynstra Gudde  
 Grontmij Nederland  
 Vicrea

**Composition of the consortia**

All consortia show a public-private composition. The size of the consortia varies considerably and bears no relationship with the financial size of the projects. Small projects can have large consortia, and vice versa. Research institutes are dominant in the consortia. About half of the consortium members is a research institute. Companies represent the smallest participant in the consortia, both in number and in size. Representatives of public institutes hover in between. The Wageningen cluster WUR / Alterra<sup>6</sup> and the Technical University of Delft participate most often, both as member as well as project leader. Also local fire services, provincial governments and municipalities are heavily represented, followed by the federal Water Management Service, TNO and the Cadastre (at several locations). ESRI, a globally operating American GIS software firm, represents with its Dutch office most often the private sector in the consortia. Other companies that participate often are Geodan, Bridgis, Navteq, CapGemini and Grontmij. All these companies are members of the Dutch Business Platform Geo Information BGI (See box).

**Discussion per theme**

Below the four themes of RGI are discussed one after the other. First each theme is described at theme level. Second, the selected theme projects are described and subsequently assessed (printed in italics). Third, some follow-up options are discussed. Each theme discussion is closed off with a table containing plusses and minuses as assessment codes.

**Theme National Geo Information Infrastructure**
**Theme**

NGII is the leading theme of RGI. Obviously all projects in this theme contribute in some way to a National Geo Information Infrastructure. While being strongly associated as a result of being part of the leading theme, all NGII-projects operate independently and there is no logical or operational sub-clustering of projects in this theme. The thought behind NGII is that a transparent, available, accessible and well stocked facility provides the basis for a variety of commercial services and products. Often, projects disclose relevant data in order to offer it at no or limited cost. It is assumed that subsequently innovative value is added by others, such that the resulting products and services can enter the market successfully. NGII projects therefore are not primarily innovative themselves, but provide an opportunity for others to develop innovations that make a difference, that challenge relevant problems and that open up new markets in order to make a

<sup>6</sup> Alterra is limited company (BV) and forms an organisational and geographical entity with WUR and as such a centre of activity in the selected projects. Alterra is not a member of BGI.

profit. Of course, individual citizens can and will access raw GIS data as well, but it will be mostly companies that add innovative value.

Disclosure of and access to public geo-information is exactly what the private sector asks for. The industry platform BGI, in its strategic agenda, says: "Part of the geographical data in the Netherlands is put together and managed by government. Such data is often not easily accessible by others. As a result, the societal and economic potential of this data is underutilized. BGI is of the opinion that government data should be freely accessible, and that government and industry should collaboratively develop useful models for exploitation".

All selected projects within the NGII-theme closely match that principle and cover many approaches with both specific national interests on one hand, such as national sewage systems, as well as an international leading position in the development of technical standards on the other.

### Projects

RGI-006 (Geowindows) is aimed at the application of existing GIS and ICT standards to disclose existing Geo-information and thus draw attention to the data and make sure it is accessible and usable. The power of geo-information lies to a large extent in the combination of different databases that hitherto remained separate. In practice, the usability of the combined set is determined by the usability of the worst usable single database. The universal application of accepted international standards is a solution to this problem. The framework of Geowindows provides the core of this approach. It offers an imperative for technical agreements on detailed level as well as system level. There will be five Geowindows: green (environment and nature), brown (soil), red (built environment), white (earth observation) and black (infrastructure). Cases are being developed in road management, odour nuisance, and residential areas. The contacts of the consortium with the European standards project INSPIRE are solid. From within the large consortium Geowindows a core team of trendsetters has emerged. There is intensive collaboration with other RGI-projects. The OpenGIS consortium's Digital Rights Management Group has embraced the concept of Geowindows. The services offered by the red window are already commercially used by the police and by real estate brokerage.

*Geowindows is the largest single project in the entire portfolio and constitutes, as the first successful tender project, an important stronghold for RGI and many other individual projects. There is no doubt that the concept of Geowindows is well adopted, with its - literally - multicoloured spectrum of cases and application areas. The contracts with the police and the real estate brokerage are an example of the application opportunities of Geowindows. The potential for delay in the execution of the project as a result of size, complexity and the number of partners has been flexibly circumvented by the formation of a core team within the consortium. By restricting the scope to existing and accepted standards, the speed of development can remain high. Functional links with the themes OOV and ROI offer numerous product-market combinations that make a difference, for instance in transportation of goods, in financial services and in networks for energy, data, water and food. The leap towards international markets is potentially facilitated by the outstanding international contacts of Geowindows.*

RGI-011 (3D Topography) primarily concerns scientific research. It combines the strengths of internationally renowned scientists on input data and on modelling of geo-information. The project aims at a fundamental and integral approach for 3D topography and strives towards a breakthrough in common practice that currently offers partial and fragmented ad-hoc solutions that are not particularly satisfying. In doing so, the project will literally add a dimension to NGII. There is productive collaboration with other 3D projects in the RGI-portfolio, such as for instance RGI-013. The international connection in this predominantly scientific project is well taken care of. Also, there is a direct link with INSPIRE. The project has been allowed so-called top-ups for 2007 and 2008. 3D Topography has won the innovation-award (science)<sup>7</sup>. The developed software and data are universal and among others applicable in all areas of attention of RGI.

<sup>7</sup> The GEO-innovation awards in the categories economy, science and society have been assigned by the audience in the course a national RGI-conference. This underlines the broad definition of innovation that RGI prefers to adhere to.

*Whether 3D topography will contribute significantly to innovation remains to be seen. Should the results of scientific research become freely available to all product developers, i.e. through open publication of the results, it may become difficult to maintain the distinction between developers that is needed to set them apart in the market and to generate profit. In the project description no reference is made to protection of intellectual property rights (IPR). The industrial partners in the consortium, Oracle and Nedgraphics, may experience advantage from IPR protection, but on the other hand, as a result of the many excellent contacts with other RGI-projects, such protection may not be easily realised. What remains is the need for head start – the industrial partners will have to speed up commercial developments to stay ahead of the competition. If this succeeds, then the innovative potential of the leading position of The Netherlands in this area can be exploited.*

RGI-014 (NODC-i) discloses available oceanographic and marine data and information. According to the consortium, this is of importance to research and knowledge development regarding oceans, sea, and coastal zones as well as to effectively support marine economical activities, plus management and policy regarding the marine environment. Nationally, the project is well connected, but it bears the sluggish image that comes with membership of a large number of vast governmental organisations. There have been administrative delays. Also there is a lack of focus on data and systems. In the meantime phase 2 of this project has been approved. This phase is now considered as one entity that includes phase 1. The connections with industrial users have been activated. Now it is important to remain vigilant with respect to 'outreach', as the project has a tendency to stick to old-boys networks and adhere to ways and means of the past. *NODC-I covers a terrain with an almost legendary level of unavailability of public geo-information, ranging from unknown locations of buoys to inaccessible information about currents and tides. As a result the potential is large, but the project lacks a sharp focus on entrepreneurship and application outside the public sector. As yet, entrepreneurial civilians obtain more practical results than this heavy consortium (for an example of civil entrepreneurship, see [www.filo.nl](http://www.filo.nl)). The consortium and RGI however have recognized these shortcomings and have taken measures to improve the situation. Should this succeed, then there is a realistic expectation for this project to still fulfil its promises.*

RGI-019 (Population database) has, in a short period of time and for a low budget, succeeded in providing a working prototype for reliable data on the composition of the human population. This can be a step up towards a universal population database based on reliable input that can save considerable time and effort and can improve output quality considerably as well. Further development, outside the framework of BSIK, will be executed by project leader Bridgis and probably by others as well, given their proprietary practice of working under contract of clients that have an increasing need for population data of high quality and detail. *'Population database' deserves the qualification 'lean and mean'. On a shoestring budget the small and decisive consortium has delivered high quality result. The fact that Bridgis will now continue the effort offers much hope for commercial success, as Bridgis is the prime private service provider of population data in The Netherlands. Expansion towards other markets will not be easy, given the legal pitfalls as well as the social and cultural differences between countries. However, with ample ambition and drive, a population database for the entire EU may be within reach.*

RGI-027 (Mutatis Mutandis – MutMut) realizes cost saving and efficiency improvement in keeping geo data up-to-date by focusing on mutation signalization within national collaborative projects as well as within European frameworks for research and development. In the RGI tender of 2006, two top-up proposals have been rewarded. These are 3d2d, research regarding 2d representation of 3d objects on earth observation images, and MutMut Naturalis, researching environmental mutation signalization that is, as a rule, continuous, such as succession, erosion and growth. In the meantime The Netherlands has become a leader in the field. In 2006, mutation signalization is considered to be one of the largest efficiency improvements regarding geo-data maintenance. Mutmut seeks international connection, but as yet actual collaboration is limited to the partners of the consortium.

*Mutatis Mutandis challenges an enormous problem, namely the general identification of changes in GIS-data in order to effectuate the specific mutation with the goal to remain up-to-date with simple procedures. It is recommendable that already The Netherlands has taken a lead position in this field. This position can be translated into commercial success, but a warning is in place: securing the IPR could provide the needed strong fundament to base this success on. From this perspective, intensive international contacts offer both pros and cons. It would be wise to discuss the matter of IPR within the consortium, in case this has not been addressed already.*

RGI-116 (Scouting innovations in GEO standards). In this project RAVI strives for a leading position of The Netherlands within the European INSPIRE project, as well as within CEN, ISO and OGC, plus, in reciprocity, an ambitious application and knowledge development regarding INSPIRE standards in the NGII. As NGII constitutes the basis of the RGI program, all projects in the portfolio are committed to using the standards. Nevertheless, collaboration with other projects shows ample room for improvement, in particular regarding practical feedback. In the coming years, this project, which is primarily aimed at innovation, will try to profile itself more distinctively. However, as a result of its character, this project is not assessable in terms of the three major analytical dimensions. Therefore, it has not been scored in the Table below.

*Scouting innovations in GEO standards, through its focus on standards development, offers an indirect contribution to innovativeness. Its mission, to play a leading role in the international standards society, surely is commendable and also offers an attractive perspective of incorporation of national experiences in the international standards. This may improve their national applicability, which in turn may result in a head start for product and service development. In addition to this practical approach there is also the downside of possibly bogging management issues that almost naturally come with international standards development. Internationally coordinated standards development is not a condition sine qua non for innovation. International standards can also emerge 'naturally' from industrial successes. Some examples of lengthy deliberations regarding international standards development show little progress, ranging from the European electricity socket to HDTV. There should therefore be a productive balance between international standards development and practical application. Provided RGI-116 will remain cautious to preserve this balance, the project will indeed be able to provide an indirect contribution to innovation.*

RGI-117 (Geodata, from provision to access) is aimed at the identification of organisational, legal and financial obstacles in gaining access to geo data. It is also aimed at removing these obstacles, in particular for the benefit of companies that develop products and services based on such data. It is also dedicated to creating awareness, lobbying and marketing the principle concept of public geo-data access, aimed at government, industry and society, as this will help to alleviate problems with the emergence of GIS markets. There is intensive collaboration with three other RGI-projects. As a result of its character, this project is also not assessable in terms of the three major analytical dimensions. Therefore, it has also not been scored in the Table below.

*Geodata, from provision to access, has to battle similar threats as RGI-116. Legal, organisational and financial obstacles can seriously hamper innovation. The project may expose such obstacles, and may remove them. Maybe it can help to circumnavigate them. All such actions can support innovation. However, as yet, RGI-117 is a lobby project aimed at policymakers in order to convince them that it is necessary to change the orientation from supply driven to demand driven by providing access to data. This is certainly important – as policymakers do acknowledge – but it differs in actuality from exposing the obstacles themselves. The year 2007 will show whether the original project focus will sink in.*

RGI-162 (Sewage systems) is putting together a national geo-data model for sewage system management focused on monitoring quality erosion, among others by ageing. Decentrally stored quality management data are being combined with environmental aspects such as soil composition, groundwater level and traffic strain. Thus a national database for sewage system management evolves. In addition, the project provides a pilot for GIS-related integration of information of all aspects of residential water management. The functional design for the end product was defined in main terms in 2006. Through contacts with RAVI, and with representatives of Geowindows, and of NEN, TU-Delft, Alterra and TNO, RGI-162 has coordinated its activities

with other projects in the RGI-program. In the first half of 2007, a prototype of the prognostic model will be available for testing by municipalities. Several tens of them have already agreed to collaborate and many others will follow soon. The core registration of underground infrastructure is taken care of by the input functionality of one of the Geowindows. The more sewage managers use the model, the more reliable the quality prognostication becomes.

*Sewage systems lies in the heart of the RGI-concept and its sewage network offers a rewarding opportunity for a case study in which the power of human networks can be unchained using geo-data. Just like for instance Wikipedia is growing and increasing its value by individual contributions, RGI-162 can also turn into a rich instrument for sewage system management. The advantages are evident and consortium organisation is solid. Innovativeness will be a function of the extent to which participants will be willing to pay for service provided. In this respect, it is important that those that are making an investment now, will be the ones that profit later. RGI-162 certainly applies an innovative approach to that principle. Expansion of the concept towards other networks, such as energy, data and transport is logical, just as connection with other Geowindows is.*

RGI-166 (Archaeological presearch) aims to improve an existing pilot method to pinpoint sub areas with a high chance on archaeological remains. Goal is to develop a structured service to support arguments for designated and detailed ground research in archaeologically relevant sub areas as well as arguments for priority ranking of such ground research. As a result of setbacks the project has just started in 2007. There is no significant progress yet. The preparations have strengthened the consortium and have put the project on a broader agenda.

*As it only just started, Archaeological presearch can only be judged from its project plan and its context. Following the Malta treaty, a market has emerged for archaeological excavation. Mostly it concerns small companies that have strong ties with universities that offer archaeological research and teaching. The number of archaeologists is small and thus limits archaeological business to some extent. The project targets this problem partly, but market size is expected to remain small. Notwithstanding the importance of streamlining archaeological excavation, the expectations regarding innovativeness (defined in terms of market success) cannot be overstated.*

RGI-189 (Sensors as sources of data). This project is aimed at testing the specifications of the Open Geospatial Data Consortium for Sensor Web Enablement as a universal principle through which data from sensors can serve as an input in the National Geo-Information Infrastructure. Testing in practice is executed with measurement areas and test facilities of partner LOFAR. Potential application covers many terrains, such as safety, water management, consumer markets, transportation en energy conservation. Such applications will be developed in 2007. Administrative delays forced the project to start not earlier than November 2006.

*Sensors as sources of data aims to provide access to sensor data via NGII. Just like we now have the opportunity to receive the weather status and forecast via the media, we should in the future be able to receive a status and forecast in other sectors. Already traffic congestion situation is available in the blink of an eye. Future application areas are only limited by imagination. But a lot of effort remains to be taken care of. The treatment and interpretation of sensor data, for instance, requires a major effort, because data and information can only become valuable if the proper amount of knowledge is added. To realize this in all areas that RGI-189 mentions is a major operation. It would be wise to restrict the efforts to one or two application areas. To obtain innovative success, clients must pay for services through financial arrangements. This will require some creative thinking.*

#### Follow-up

Realizing a new infrastructure is a major endeavour. None of the current existing infrastructures, for instance for transportation of goods and individuals, energy, data, food, etc, has been realized overnight. All existing infrastructures have developed gradually over time, from small to large, on the basis of practical experiences that in itself are useful and often without a preceding grand design. Every now and then there may be a revolutionary development that provides an important impulse to infrastructure. That may be a standard, such as TCP/IP that provided the basis for Internet and the revolutionary development of the world wide web. This theme also contains

promising developments that may provide a strong impulse to the NGII, such as mutation signalization, 3D representation as well the disclosure an combination of completely new sources of data. At the same time, there is ample dedication to a variety of application areas, such as sewage systems, population databases and oceans. The vastness and depth of this theme cannot be fathomed and given this fact, the portfolio strikes a practical balance. The saying: 'Mastery is obtained by limitation' is also valid in this case. However, some projects could stay closer to the original scope and others could benefit from a even more narrow scope than originally described in the project proposal. In addition, attention should be directed towards the protection of intellectual property as well as for the question in what way publicly accessible data can serve as a basis for a profitable value proposition. In doing so, also the maintenance of data and services should be taken into account .

**Table 2. Qualitative assessment of the speed, the distinction and the revolutionarity per selected project in the NGII theme. Innovativeness is the mean assessment (See Appendix B for further explanation)**

project	speed	distinction	revolutionarity	innovativeness
Geowindows	++	++	+	++
3D Topography	+	++	+	+
NODC -i	-	0	0	0
Population database	++	+	++	++
Mutatis Mutandis	++	++	++	++
Scouting innovations in geo standards	~	~	~	~
Geo data from provision to access	~	~	~	~
Sewage systems	+	+	++	+
Archaeological presearch	-	-	-	-
Sensors as sources of data	-	+	+	+

### ***Theme Public Order and Safety***

#### Theme

The balance between the selected projects within this theme reflects in a nutshell the reality that within each theme there is always a need for, on one hand, short term inspiring results and, on the other hand, long term fundamental developments that provide the undercurrent for the waves to continue rolling in. RGI-123 is such a wave and has for that reason received an innovation award. The project has thus been in the news and has as such strengthened the importance of GIS within the theme. With the undercurrent of RGI-128 and RGI-239 similar waves will occur in the future, not just in the 'red' of the fire service, but also in the blue and in the white or yellow of police and medical care, and in numerous other (colours of) public and private services.

Projects such as RGI-128 and GI-239 are conditional to the success of projects like RGI-123. In soccer terms, RGI-123 is offence, RGI-239 is midfield, and RGI-128 is defence and base. RGI-147 is a second offensive player.

In terms of revolutionarity none of the projects score high in the OOV theme. Completely new paradigms or solutions to very huge problems are not offered. The approach is more in terms of combining existing knowledge, technology and the demand for information in existing application areas. Nevertheless, detailed static and dynamic information is not available momentarily, not on scene, not in central radio rooms and not in policy arenas. In that respect the projects fill an important gap. The market for national risk prevention and disaster contingency planning is relatively small. Therefore expansion of the concepts to other markets is a way to foster innovativeness.

The networks that have emerged as a result of the collaboration within and between these projects take care of an important condition for innovation, namely the realisation of transparent markets where supply and demand can interact in an early stage of development. As such, the projects in this theme display a balanced and cohesive portfolio.

### Projects

*Cluster 1. Risk management and geo information. RGI-001 / RGI-128 / RGI-239 / RGI-123*  
RGI-001 (Risk management), as a definition study, hypothesized that an integrated approach of policy information needs regarding both the prevention of disasters and battling disasters – together called disaster management – could obtain synergetic advantages from a common geo information structure. However, interviews and workshops brought to light that the information needs of professionals in both arenas of risk prevention and disaster battlement differ too much from each other for this synergy to actually function. Therefore a divisional approach has been realised in two follow-up projects RGI-128 and RGI-239.

RGI-128 (Geo information for risk prevention) is aimed at the policy part. An important point of attention is the way in which involved authorities and societal actors communicate regarding planning, risk prevention and spatial planning. Geo information and the combination with several relevant static and dynamic databases provide a communication tool that can improve transparency and promote trust. The executive consortium understands very well that, in addition, planning is a political process, in which rational information may for various reasons not have any influence or may be put to strategic use. Within this context the development of a network within RGI-128 can be seen as an important result. At the moment there are activities centred around two cases, one in Arnhem and one in South-Holland.

RGI-239 (Open Safety Platform) is aimed at battling disasters. It is well adapted to various European and related national developments, with as important characteristic the development of an 'open source' standard for services. Based on such open source standards, applications can be developed that have to and can take regional aspects into account. It is for this reason that RGI-239 is aimed at such regional aspects. The mid term project report has indicated that the project has succeeded in providing a large contribution to the societal and policy aspects of the discussion and to the developments regarding geo spatial data infrastructures for disaster battlement. Much quicker than anticipated, it has sought and found connections with regional, national and international bodies, including a rapid adoption of the data infrastructure. This can be tested at the upcoming test in 2007.

RGI-123 (Fire service 100% mobile) takes the same approach as RGI-239 and concentrates on the activities of the fire service, both on location of the calamity as well as in the radio room. The data module to be used on location is ready and has been tested. Work on the radio room module is ongoing. With this product the commander can oversee all relevant spatially determined information in the blink of an eye, including the position of service personnel. On March 14<sup>th</sup> 2007 RGI-123 received the geo-innovation award in the category 'society'. This award is the icing on the cake. RGI-123 has rapidly developed a working model despite the geographical spread of some of the participating fire services across the country. RGI-123 does not have international connections.

*The speed shown by Fire service 100% mobile (RGI-123) displays an element of the innovative potential within this theme. In this theme it is possible to quickly develop a working prototype by combining the supply of existing knowledge, information and technology with the existing demand for detailed static and dynamic spatial information of disaster fighters. The immediate and dominant information need of the commander has now in large part been taken care of, and the radio room will follow. The speed that RGI-123 could develop, despite the geographical spread of the team, may have been high as a result of skipping national and international agreement issues. Having said this, we should bear in mind that future commanders will require different kinds of information. Therefore, without ongoing innovation, RGI-123 will not provide a definitive answer to such future questions. New questions can be answered with new combinations of knowledge and technology that become available through, among others, the development of open source technology standards and through insight in the relation between information and decision making. Distinctive, in the case of RGI-123, are the powerful can-do attitude aimed at problem solving that has been shown by the project team, also based on the relatively narrow*

*focus of the fire service. Both other projects show a similar distinction with their case-oriented approach.*

*Risk Management (RGI-001) did not have a narrow focus, as is to be expected from the character of this definition study that preceded both follow-up projects.*

*Whether and how available information is going to be used was partly the topic of geo information for risk prevention (RGI-129), albeit in a different sector than fire service.*

*Open Safety Platform (RGI-239), also with a slightly different application area than RGI-123, functions as a bridge between both of the other projects and takes care of intensive national and international exchange regarding the development of international open standards.*

RGI-147 (Real Time Inwinning) is also aimed at battling disaster, but this time, literally, from a completely different point of view, namely that of a remotely controlled mini helicopter that provides real time images of the disaster on location. This practical project has succeeded, in the brief period that was originally planned, in executing both the intended technical development, test flights, and demo's. In RGI-147 a so called top-up has been proposed (no further data available at the time of writing). Both companies in the consortium, Miramar and E-productions, together have set up a new company named 'Geocopter' to technically develop the concept further and expand the service to other sectors in addition to disaster fighting.

*A distinctive aspect in real Time Inwinning was the access to a working platform and the technical approach dedicated to getting results. The combination of this particular platform with the application area may be unique and has drawn world wide attention. The start of 'Geocopter' indicates the potential for business, among others through the exploration of additional application areas. The technology has not been patented. There are many earth observation platforms and many ways to get images from the surface of the earth within or outside the visible spectrum. As a result, Geocopter should be ready to face technological competition, for instance from the angle of military technology. To strengthen innovativeness it is therefore important to focus on new combinations of technical hardware and software with the orgware of disaster fighting and other application areas.*

#### Follow-up

Follow-up projects within this theme, if any, should utilize both the strengths as well as the cohesion in this theme and expand it to other application areas. A typical area with great distinction and global impact for instance could be Rotterdam harbour. In particular the container infrastructure has been mentioned often in regard to terrorism as a weak infrastructure that is prone to intentional or unintentional disasters. OOV projects could add considerably in preventing and battling risks associated with the container infrastructure. Collaboration with new partners, such as customs and the container terminal managers, will in that case be necessary.

**Table 3. Qualitative assessment of the speed, the distinction and the revolutionarity per selected project in the OOV theme. Innovativeness is the mean assessment. Cluster framed bold.**

<b>project</b>	<b>speed</b>	<b>distinction</b>	<b>revolutionarity</b>	<b>innovativeness</b>
Risk management	+	-	-	-
Fire service100% mobile	++	++	+	++
Geo information for risk prevention	+	+	-	0
Open safety platform	++	+	+	+
Real time inwinning	++	++	+	++

### ***Theme Spatial Planning***

#### Theme

Within this theme we see, in the selected projects, important conditional elements for innovation. No doubt the impact of DURP (digitally exchangeable spatial plans) is most heavy in the long run. Within DURP a treasure of public data becomes available on short notice as a result of the effect of the Spatial Planning Law. All other projects can benefit from that, plus also the entrepreneurs that set out to offer services based on such data.

Geofarmer connects with a sector of great importance to The Netherlands, with 'flowers and food' as a key area recognized as such by the Innovation Platform<sup>8</sup>. Moreover, it is connected to important trends, such as precision agriculture. The profession of farmers lends itself excellently to innovation, for one because the sector is under high pressure, ranging from directions for crop protection and disease eradication to reduction of agricultural subsidies. The link with other projects in the theme is logical, because virtual reality is a method to enhance the representation of DURP data and because, with Simlandscape, interaction between residential and rural spatial planning can be simulated.

### Projects

#### *Cluster 1. Geofarmer. RGI-004 / RGI-176*

RGI-004 (Geofarmer) has, in an appealing manner, presented five scenarios for realising a useful alliance between agricultural business and geo information. The strong power of the applied methodology is that the user has been involved. Not only does the project approach this challenge through transgressing the boundaries of the governmental monopoly on geo information in this sector, but, more specifically, by putting the farmer in the centre of the geo information network. Starting point for this is that nobody but the farmer himself can better monitor the quality of input data. Practical detail is that the farmer for instance provides parcel data with the aid of GPS. Of the five scenarios, project pre proposals have been written. One of these has been awarded (RGI-176). Geofarmer is a Dutch project without international collaborative connections.

RGI-176 (Geofarmer) is aimed at easing the communication between farmer and government concerning subsidies. The geo information structure can lessen the administrative burden considerably and increase quality. Moreover, in the meantime, the use of GIS in such communication has been announced to be compulsory. Precision agriculture is the key term in this. Also other organisations in addition to RGI run interesting projects, such as the GEOlogic project, with which RGI collaborates. From the perspective of organisation and administration, RGI-176 hasn't developed according to plans, however an important outcome is the development of a working standard for the exchange of parcel data. Geofarmer has obtained the innovation award (economy).

*Geofarmer has made the concept of precision agriculture operational by putting the farmer in the driving seat. That sets the project apart from other preceding projects. From the available monitoring reports it can be concluded that the relation between farmer and government has benefited tremendously and that the sector is now convinced of the utility of geo information in agriculture in many ways. Also, Geofarmer has rapidly developed a new standard, given the national character of the project. Indications are that this project is rather unique, which improves the chance for innovative application of services. Again, speed is a condition in this respect. Also, in the meantime European support for follow-up projects has been secured, offering a step up for the required international scope and development.*

#### *Cluster 2. DURP. RGI-002 / RGI-180 / RGI-314*

DURP (digitally exchangeable spatial plans) is a major project within the framework of the spatial planning law (WRO). This law requires all plans and data of public projects to be publicly available. Halfway 2008, a website ro-online (the DURP portal) will go on-line. Most of the associated work is being carried out outside the RGI-framework, but some sub projects have been awarded within RGI.

RGI-002 (Fundamental Maps) focuses on the best background against which spatial plans can be visualised, also in regard to technical considerations concerning the optimisation of 'zooming in'.

RGI-180 (Market research DURP portal) is a market analysis to determine user demand with respect to ro-online. A specific user group consists of those companies that want to develop dedicated services based on the data.

RGI-314 (Google DURP) is a demonstration program that develops an application for the general website onzegeo.nl. The application combines spatial plans, Google maps and the Flamingo

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<sup>8</sup> The National Innovation Platform is chaired by the Prime Minister.

viewer into an inspiring example of the power of such combinations. Whether you are looking for zip codes or bird sightings, the application will visualise it.

*The mere fact that DURP makes a detailed inventory of user demand, ranging from civilians to entrepreneurs, is a basis for trust in the applicability of the expected outcome of ro-online. DURPs development runs largely independent of RGI. From this respect is it an advantage that some projects have been awarded within RGI. This takes care of the important and necessary anchorage with the Dutch geo information community. Of the selected RGI-DURP projects, RGI-002 (Fundamental maps) is the largest. The term 'fundamental' in the title clearly indicates the character of this project. It is a fundamental project four reliable user friendliness. In addressing this topic, RGI-002 is fundamental to the appreciation of individual civilians to the DURP portal. For professional users this may be a less important argument – they are most likely interested in just the disclosure of data, and will visualise that data the way they see fit as part of the products and services they set out to develop.*

*RGI-314 may offer an appealing visualisation of the potential that comes with the disclosure and the integrated provision of data concerning spatial planning. For those that are familiar with Google maps and Flamingo, the project may not be all that new. But for others, that haven't experienced Google maps and Flamingo, it is a revolutionary experience to zoom in from macro to micro and, in the process, couple all sorts of information to the map, such as cadastral data.*

RGI-013 (Virtual reality) is aimed at developing methods for rapid graphical 3D representation of residential surroundings. A new method has been developed to determine the relative position and orientation of several laser scanners that are being used for data registration. Also a method has been developed to automatically recognize measurement data of characteristic elements of buildings, such as ornaments, windows, doors and roofs. These elements are then used in an interactive method to reconstruct the 3D model of the building. At the outset, a market scan assessed the demand of users. The model has been attuned tot that demand. RGI-013 collaborates intensively with RGI011 (Theme NGII, 3D Topography).

*It is apparent that in a brief period of time, RGI-013 has developed technology to measure and recognise data and patterns that covers many visualisation needs, ranging from the visualisation of existing buildings in products such as the ones based on RG-314, to applications in the gaming industry. The latter industry, which is emerging and promising in The Netherlands, therefore provides fertile ground for the seed of RGI-013. But also other areas, such as disaster management, have a need for rapid and reliable visualisation. The 'flat' images of OOV projects signify this potential. Having said this, it should be emphasized that although 3D technology application may seem logical, it does not necessarily mean that it will be carried out in actuality. Today for instance , air traffic controllers around the globe, are still watching 2D images of air traffic on their screens.*

RGI-101 (Room for Play with Simlandscape) starts from a existing game under development, Simlandscape. In RGI-101, further development is carried out in collaboration with industry. Realisation and organisation both run according to schedule. The game is about lots that have been described and characterised using different kinds of geo information. As an instrument for planning and as a game, Simlandscape is unique. During the development there is continuous interaction with potential national and international game users, such as the Cadastre. Potential game users in principle are all institutes and bureaus that work with rural and urban planning. Demonstrations are expected to be available in 2008. The project has also led to a top-up called 'Waterscape'.

*As a game, Simlandscape is one-of-a-kind. Here, too, the perspective of many application areas is luring , such as the gaming industry, but also recreation and media. However, the developers seem to concentrate largely on the market of public services and private service providers, to develop, in a playful manner, a fundament for building policy visions using various aspects of geo information. In this approach the distinction with regard to other planning instruments may not be all that big and it remains to be seen whether policy makers really want to play. The marriage between managers and electronic boardrooms not always is a happy one, but there are powerful exceptions to the rule, such as in the military.*

RGI-254 (LUMOSpro) originates from an RGI definition study (RGI-023 LUMOS). LUMOS is a vast consortium under the auspices of the Environment and Nature Planning Bureau (NMP) that is largely independent of RGI. The most important instruments of LUMOS are the space scanner and the environment scanner. LUMOS is dedicated to optimising the use of land and offers a platform for spatial modelling and policy practice. LUMOS has intensive international contacts. The LUMOSpro project is a bridge project and as such is financed both by RGI and by Habiforum<sup>9</sup>. It strives to support the knowledge infrastructure for spatial planning by providing an adaptation of national space utilisation models and aiming them at the application in a policy environment. Because of administrative complications the project has experienced a delayed start. As a result there is little data yet on the progress.

*LUMOSpro is a complicated project with many participants and angles. The public sector is dominant and the basis, LUMOS, is financed by NMP. As a result, the connection with the private sector is thin and the direct contribution to innovation in terms of products and services that will make a difference on the market, is small. It is too early to comment on the progress as a result of the encountered delay.*

#### Follow-up

In current practice the selected ROI projects are independent from each other. This offers future opportunities. For instance, consider increasing urbanisation which will cause a need for primary food production closer to urban areas and logistical chains, in order to close agro-industrial cycles and bring production, processing and consumption nearer to one another for reasons of sustainability and animal welfare. With the design of 'agro-parks' The Netherlands currently is rather successful in countries such as China and India. In this, the combined knowledge of Geofarmer and other projects from the ROI theme can be applied directly. The same is true for the precise monitoring of movement in and around centres of intensive husbandry, with the goal to battle and prevent animal disease and contamination. In particular this latter global issue could see a major step forward based on Dutch know-how and experience, including ROI projects. However, to truly create an international orientation from the current national projects, a considerable effort is needed.

**Table 4. Qualitative assessment of the speed, the distinction and the revolutionarity per selected project in the OOV theme. Innovativeness is the mean assessment. Clusters framed bold.**

<b>project</b>	<b>speed</b>	<b>distinction</b>	<b>revolutionarity</b>	<b>innovativeness</b>
Fundamental maps	0	+	+	+
Market Research DURP portal	+	0	0	0
Google DURP	+	+	++	+
Geofarmer (RGI-004)	+	+	+	+
Geofarmer (RGI-176)	+	+	+	+
Virtual Reality	+	+	+	+
Simlandscape	0	0	+	0
LUMOSpro	-	-	-	-

### ***Theme Consumers and Students***

#### Theme

The COL theme is richly filled with projects. A common thread within the COL theme is effective and practical communication of the value of GIS to young people and others that should be interested or become involved. Project RGI-024 is dedicated to policy and management aspects. From this viewpoint it could also fit in the NGII theme and together with project RGI-117 it forms a cohesive entity. Projects that are mainly aimed at education are RGI-022, RGI-164, RGI-208 and RGI-330. Projects RGI-102, RGI-129, RGI-156, RGI-173 and RGI-233 are mainly aimed at consumers. Thus, these are two distinctive clusters in this theme that are discussed below.

<sup>9</sup> Habiforum is another BSIK program

The portfolio of selected projects in the COL theme offer a kaleidoscopic view to everything that may be of interest in this theme. There is little doubt that related consumer products and services can flood the market soon. Of course, RGI can only reflect that upcoming flood in a limited manner. Powerful market sectors are about to disclose and utilise the power of GIS. One such sector is tourism and recreation. Projects such as the digital dowsing rod fit that future, and that is only the tip of the iceberg. Education also offers a wealth of opportunities, albeit that the market perspective seems less explosive in that case. Enrichment of geographical education with for instance GIS based expeditions no doubt fills the need for experience, but many other possibilities can be thought of outside geography as well.

### Projects

RGI-024 (GEOGOV) follows up on the program 'Internet and public management' and carries out interdisciplinary social scientific studies, both fundamental and applied, into the societal, political, managerial, organisational and legal dimensions of the use of GIS systems in the Netherlands government. It is specifically aimed at the role of geo information in processes of agenda setting and policy development. Gradually the consortium has been expanded and interesting contacts have been made, among others with Google Earth. Among the many publications and presentations, a book has been published as well. Because of its character this project is difficult to score in terms of the three dimensions of innovativeness and therefore has been left uncoded in the concluding Table.

*Geogov, as mentioned above, would also fit well in NGII, together with project RGI-117. Directly, little innovativeness can be expected from this project that focuses primarily on debate. Also for this reason, the scoring dimensions speed, distinction and revolutionarity have little meaning. The concrete connection of the project with Google Earth is refreshing.*

### *Cluster 1. Consumers. RGI-102 / RGI-129 / RGI-156 / RGI-173 / RGI-233*

RGI-102 (Traffic expectation) combines weather data with traffic data and comes up with an expectation on the basis of algorithms that are the result of the project and in which the influence of weather on traffic has been accounted for. The original consortium has been changed because the initiator, Logica CMG had to withdraw as some of the intended personnel had left the company. In restarting, Meteo Consult has put together a new consortium and has made a few changes that have not weakened the project. These complications have however delayed the project and there is no data on progress yet.

RGI-129 (Cyclocity) is a small project that makes and fuses panoramic pictures in order for a virtual world to emerge without the use of expensive VR technology. The combination of photogrammetric and computer vision technology is the innovative angle in this project. For various reasons the start has been delayed, and little can be reported about progress.

RGI-156 (Digital dowsing rod) is looking at making cultural and historical information available in connection with locations surrounding hiking and biking trails, using the approach of Location Based Services (LBS). These services should fill the needs that come with growing markets for leisure and the elderly. Also tourists nowadays demand more quality. The project is a case study for mobile GIS, integrating UMTS and GPS using Web 2.0 technology. At two locations, the Grebbeberg and Nijeveld, tests will be conducted in the summer of 2007. The developed software is open source.

RGI-173 (Sense of the City). The combination of GIS, Google Earth, GPS, mobile telephony and Web 2.0 in Sense of the City offers much faster and more accessible applications of geographical information for consumers. It results in an interactive atlas on the web and is probably the first application of 'locative media' based on Web 2.0 in the world. Two working prototypes have been delivered in the city of Eindhoven. Another one follows in Amersfoort in 2007.

RGI-233 (Usable Mobile Maps). The interpretation of displays will benefit from a method of zooming in whereby the overview map gradually changes to a detailed map by way of animation. In order to realise this, efficient data structures are being developed for variable scaling storage as well as for transfer from the server to the mobile receiver. The result is translated into prototypes. Industrial partners ESRI and Laserscan and application partners ANWB and Amsterdam Municipality offer a perspective on actual application. Search is being continued to find a partner focused on hardware. A top-up has been awarded with respect to international anchorage.

*Traffic expectation is not specifically aimed at GIS, but more at the combination of two sets of data. The significance for the development of the GIS base in broader terms therefore is not high, but it does result in a new and fun perspective for a variety of traffic services. The impact may be important in terms of prevention of congestion. In addition, the consortium has shown to be able to adapt quickly to changing circumstances. This leads to high expectation of speed, as a qualitative measure of innovativeness.*

*Cyclocity has little to do with GIS, but it is innovative because it combines approaches that remained separate so far. With little means it has delivered a lot of output. The team is small and productive. Moreover, the problem of expensive VR environments is circumvented cleverly. By connecting to some related RGI-projects this project could see innovative follow-up.*

*The digital dowsing rod joins a number of undeniable social and technical trends. Often this is a recipe for success, especially when the project continues on to develop an prototype.*

*Nevertheless, it is justifiable to put the question forward who eventually is going to make this happen commercially. In order to make money with this, a solid business plan is needed from an ambitious entrepreneur. This requires a focused effort, and there are plenty connections to go forward with. One connection for instance is the new recreation innovation program of the Ministry of Economic Affairs that is in part aimed at developing rural areas.*

*Sense of the City shows, just like the previous project, that technological opportunities lie in the combination of information and systems. However this project lacks content, that is, the content is delivered by the user only. The user puts his or her 'experience of the city' in the information system, with or without pictures. But what kind of content is that? Who is interested in that content? Who is the user of Sense of the city? What problem is being solved? As a demonstration project, this project may be a technological leader, but as a business model, many questions remain unanswered. As the consortium is fragile, the expected innovativeness can only be low this content. However, with a more professional approach of content this situation may change. Therefore a strong business plan could offer a way out. This small consortium needs help with that.*

*Usable Mobile Maps is potentially able to quickly make a difference on the market of mobile map use. Knowledge protection is a must in that case. The relation with GIS is small and as a consequence, the project is not at the heart of RGI. However, the users of GIS can benefit from it. Unless other companies have already put forward comparable technologies (this is difficult to judge because developments go fast – see Google Earth) this could represent an innovative leap that fits well with ergonomical needs.*

#### *Cluster 2. Education. RGI-022 / RGI-164 / RGI-208 / RGI-330*

RGI-022 (EduGIS) wants to stimulate the use of GIS in post elementary school education by offering a low barrier, open internet environment, with geo information that allows students to analyse issues regarding society almost independently, rapidly and efficiently. The website [edugis.nl](http://edugis.nl) has been haunted by technical problems that have been solved by now, among others by using smart software. In the starting phase the level of content was too low. In the meantime content has been added, also outside the boundaries of geography, for instance with the top-up mobile math, a mathematical game. The functionality has been expanded with Google Earth. The limited radius that the consortium had in the beginning has been expanded with more partners and more areas of attention. Much has been done to inform teachers and students. In 2007, the contacts with 'Knowledge Net' will made operational, plus contacts with other RGI projects.

RGI-165 (Geoweek) takes care of the organisation of annual school activities (ages 10-14) concentrated in a week in the fall, to connect students and teachers to companies and institutes in the area of GIS, and thus contribute to knowledge spread, innovation, awareness and acknowledgement for the beta side of geography. In part because of striking media attention, including a related youth television program (Dropzone) and a land exchange game, the participation in this event, after only a short preparation period, has been overwhelming. All thirty participating companies are RGI-companies. 2000 Students have participated.

RGI-208 (The Climate Game) is aimed at developing a climate game for youngsters by combining modern game technology with geographical climate information systems. This combination is its unique strength. In terms of promotion, negotiations have been undertaken with MSN messenger, the preferred communication channel for the youth. Via a partnership with UNESCO the game can be distributed around the globe. A prototype demonstration has been welcomed

internationally. The original consortium has been rocked by differences in opinion regarding the expected result, for which the proposal indeed left a lot of interpretative room. In the newly formed consortium the members have synchronized their visions, but the project has experienced considerable delay.

RGI-330 (Innovative Geo Education) wants to transform an existing fort on an island (Fort at the Nieuwe Steeg at Leerdam) into a showpiece of the geo sector, where teachers and students can experience relevant innovations in a surprising manner. Teachers can attend an application course, in which they are immersed in the world of GIS and GPS. Students that visit Geofort experience geo-ICT interactively. Based on a market analysis and an inventory of demand and supply in GIS innovations, the project develops a 'hunt' that will be supported by PDA/GPS/GPRS and virtual 3D technology. The project started only recently. There is no material on its progress yet.

*EduGIS gives reason to worry about the maintenance of the portal. Liaison with educational publishers could help, but then the question remains how to provide the portal with content. The approach seems a bit old-school, top-down. EDUGIS should look for possibilities for distributed content delivery, by taking the users as an input channel. The project to some extent lacks inspiration, but that could be taken care of by collaborating with others, such as Geoweek and the professional association KNAG.*

*Geoweek is the showpiece of the KNAG. The sizzling participation at Geoweek is stimulating for the follow-up and for the institutionalisation of this annual event. By linking to educational publishers the continuity of this concept and related services can be taken care of. In terms of market success the link with the media and in particular the successful youth television program Dropzone should be strengthened. The concept may possibly be marketed internationally.*

*The Climate Game will have to combine the design of the game with a newly composed consortium and base it on the findings of an international test panel while creating a market for the game. That is a major task. Surely, the target group can be reached through MSN, but MSN is not a platform for playing the game. In other words, questions remain about the future platform. Should that be a dedicated game computer, and in that case, should a connection be made with for instance Sony or Nintendo, or will it be web-based? In the latter case, the question is how a profit can be made.*

*Innovative Geo education will maybe be able to remain slightly profitable if connected to the market for school outings and business trips. Significant amounts of money will not be made that way, but RGI's goals will be fully supported, and the joy that is clear from the project may inspire many.*

#### Follow-up

The focus on consumers and students will – according to expectation and project design – lead to inspiring examples as well as to an informed new generation that, as a professional or as a user, can contribute significantly to the optimal use of GIS. For consumer products we are only at the beginning of scratching the surface of the possibilities. In terms of results it is therefore important to gain more insight through dedicated endeavours in application areas and product market combinations, among others by communicating with many representatives of sectors that have hitherto not been covered. Regarding education the impression is that a correct angle of attack has been chosen by creating enthusiasm and inspiration via games, manifestations and television programs. But GIS is also a serious matter. To make sure that that is seriously covered in the curricula, there should be flexible and dynamic end terms that could be used as a target by teachers and students.

**Table 5. Qualitative assessment of the speed, the distinction and the revolutionarity per selected project in the COL theme. Innovativeness is the mean assessment. Clusters framed bold.**

<b>project</b>	<b>speed</b>	<b>distinction</b>	<b>revolutionarity</b>	<b>innovativeness</b>
GEOGOV	~	~	~	~
Traffic expectation	+	+	+	+
Cyclocity	+	+	+	+
Sense of the city	+	-	0	0
Usable Mobile Maps	++	+	+	+
EduGis	0	+	0	0
GeoWeek	++	++	+	++
The Climate Game	+	+	0	+
Innovative Geo Education	+	-	-	0

**Appendix A:** Composition of the Advisory Board

## Members

Henk Ottens	TNO, Adviesraad Wetenschap RGI
Martin Peersmann	TNO, Adviesraad Gebruikers RGI
Hessel Speelman	Advisor knowledge infrastructure
Theo Overduin	GeoNovum
Bouke Ybema	Radio Room Kennemerland
Yvette Pluijmers	BGI

## Others present at the board meeting of 18 June 2007

Arnold Bregt	WUR, scientific director RGI
Jacqueline Meerkerk	RGI, program director RGI
Miep van Gijsen	RGI, program manager RGI
Erik van de Linde	Prisma & Partners

**Appendix B:** significance of the assessment codes

In the Tables plusses and minuses have been used as codes. This approach is common in many other assessment procedures. The codes have the following meaning:

<b>Code</b>	<b>speed</b>	<b>distinction</b>	<b>revolutionarity</b>	<b>innovativeness</b>
++	Very rapid	Very big	System change	excellent
+	rapid	big	Very large change	good
0	normal	reasonable	Large change	somewhat
-	slow	hardly	Small change	little
--	Very slow	none	No change	poor
~	No assessment	No assessment	No assessment	No assessment

The assessment has been carried out objectively and qualitatively. The column 'innovativeness' represents the 'mean' of the previous three columns.

### Appendix C: Comparison of the results of the Quickscan Innovativeness and the Quickscan Economy.

The projects listed below were assessed in both Quickscans. The ~ sign indicates that a score could not be determined. In the section titled 'Synchronous' nine projects have been clustered that score similarly in both scans, meaning that projects with a high expected innovativeness also offer a quantifiable economic value. In this, an increasing economic value is synchronous with an increasing score 0 / + / ++ on innovativeness. The section 'Asynchronous' lists three projects that do not provide quantifiable economical expectation, but did score + or ++.

<i>Synchronous</i>		<i>Inno</i>	<i>Eco (m Euro / year)</i>
▪	<i>RGI-004 / 176 GEOfarmer</i>	<i>+</i>	<i>0,5</i>
▪	<i>RGI-014 NODC-I</i>	<i>0</i>	<i>1</i>
▪	<i>RGI-022 EduGIS</i>	<i>0</i>	<i>~</i>
▪	<i>RGI-027 Mutatis Mutandis</i>	<i>++</i>	<i>10,5</i>
▪	<i>RGI-102 Traffic expectation</i>	<i>+</i>	<i>4,5 - 9</i>
▪	<i>RGI-117 Geodata</i>	<i>~</i>	<i>~</i>
▪	<i>RGI-128 Geo info Risk prevention</i>	<i>0</i>	<i>~</i>
▪	<i>RGI-147 Real Time Inwinning</i>	<i>++</i>	<i>4,5 - 22</i>
▪	<i>RGI-173 Sense of the city</i>	<i>0</i>	<i>~</i>
<i>Asynchronous</i>			
▪	<i>RGI-006 Geowindows</i>	<i>++</i>	<i>~</i>
▪	<i>RGI-013 Virtual reality</i>	<i>+</i>	<i>~</i>
▪	<i>RGI-019 Population database</i>	<i>++</i>	<i>~</i>