



AGROffice – integrated software-technologies in the areas of agriculture, forestry & ecology

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With an integrated solution for the rural areas, as it was developed from PROGIS since several years based on the know how that will come from 2006 on, that means how new legislation and new IT technology will have impact on changes, the complex problems can be solved rather easily. All the single development steps were undertaken under the premise of targeting an integrated solution and were tested and installed at several thousand farmers' businesses as well as at hundreds of Advisory Serviceorganisations. Software is installed in many countries..... for several countries adopted versions are installed, proven and working (Germany, Austria, Slovakia, Spain)and for other countries implementations are in the process of being carried out (UK, Ireland, Bosnia, Serbia, Hungary, Rumania and Middle East)

WinGIS – the European PC GIS

Years ago I visited together with my colleague Gas of Portugal and asked within the IT group for the GIS department – the answer was: “Oh, we have no contact to them; they have their office in another location”. Why that - we asked ourselves?

The CEO of a famous US GIS company said in 2003 at a company seminar: “Don't be GI centric”! Why did she say this? Did they realize a problem?

Prof. Konecny, the president of the Internat. Cartographic Association said 2004: “My feeling is that people are not creating maps nowadays, but impressionistic pictures; they are not accepting and following basic cartographic rules. Seldom do maps present huge amounts of information!”

What happens there? Why all these comments?

Maybe there is something that unites these three conclusions? In any case the question for the future is “How can we come to a just in time solution when we are having digital data just for the reason we might need it at some points – if we find anything then is another subject. In other words, coming from data graveyards to information factories?”

When PROGIS started to develop its own PC oriented GIS system we had a “mainframe dominated situation with systems for experts that just handled huge amount of data and had limited information” but we wanted to create a software for the users that also easily could be modified with applications following standard IT rules and where the buyer was able to have a provable return of his

investment.

Situation anno 1995

“Mainframe” dominated
for “experts” only
huge development cycles
no applications
not user friendly
long learning cycles

PROGIS design criteria

PC and Windows oriented
intuitive user interface
pragmatic in functionalities
raster and vector Data
‘Smart’ performance
highest speed

We developed an object oriented GIS that handles the geographical data in its own database with lots of I/O in form of an open interface to other suppliers systems; the attributes are stored in a standard database with former DDE, later ActiveX and today COM link to any Windows database. That means an existing application can be linked easily, and even more is possible – the GIS itself could be driven by the database application. As attribute database any database that has a Windows COM interface can be linked.

From the very beginning the WinGIS system was designed as a hybrid system to be able to run parallel raster and vector graphic, had unlimited numbers of layers and lots of functionalities (can be downloaded as an evaluation version from our web site <http://www.progis.com>).

The products available today are:

System products (WinGIS XT productline):

WinGIS professional + (including PROGIS MapServer)
WinGIS professional (incl. universal attributive database)
WinGIS standard
WinMAP

And in short time WinGIS for pocket PCs

Modules:

Internal Database (Universal attribute database)
ConGIS Interfaces (Data Import and Export)
Omega Tool (Raster Transformation)
Isomodule (Creating Isolines, Isoareas, Profiles)

PROGIS Mapserver

To show projects online and work interactive on internet

Developer tools

AX WinGIS or COM Interface (Standard and Advanced Editions)

Beside selling tools, PROGIS also offers - together with partners - project development for customers, with all its technology know-how in background. Looking back from today we can say that during the last years PROGIS had consequently undertaken several steps of development:



- having its own GIS – WinGIS - with different versions, Mapserver solution, tools etc. (see above)
- having lots of data transfer technology (e.g ArcInfo, ArcView, MapInfo, DXF, ASCII, DGN etc.) allowing I/O from many competitors systems.
- have daily increased know-how in integrating several geomatic technologies (e.g. GIS + remote sensing + GPS + mobile solutions + communication skills + sensors linked) that give really power solutions
- has focused parallel for applications with in depth know-how within the company (applications for rural area management, agriculture, forestry, pipeline management, community management)
- has versions also in Arabic language beside 13 other languages available
- could help to establish the first Austrian GIS college (FHS with Dipl.Ing. FH) in Villach – the first students start to write their diploma thesis at PROGIS
- and is focusing and implementing new public-private-partnership models

Further we could during the last years embed in our solutions some significant but important new parts that not have been existing before in other GIS solutions but have been indispensable for most of the solutions; it was:

- an integrated **time management** system as well as
- a link to an **expert information** system.

The time management system:

To be provocative: A map without integrated time management is not able to process every activity on the fields, as the field is through this activity changing continuously, so it needs to include the timeframe of this to be a true map. The old model was to make new maps every 10 years, the new is to create maps due to changing attributive data, this can be automatically executed with PDA´s and GPS, to keep up to date and to show changes in form of a virtual timetravel.

Also we had to embed in many cases new organizational structures when implementing GIS systems. Further we had - mainly working on the private market - to be able to calculate in detail for any customer: “What is the return of investment when installing a GIS system”. This gave total new needs!

We started to work with bottom up oriented systems which really can be upgraded every second, developed modules that fitted to the new European legislations (e.g. agriculture, (geo)traceability etc.) and looked not only at the single users but also at user chains to be able to transfer data easily, also geographically.

The expert data model:

Besides time management the second big innovation was to embed an expert system; hidden behind is a complex database that integrates today already more than 100.000 elements like crops, fertilizers, herbicides and fungicides,



machines, costs, methods and also public data like banks, postcodes etc. Country for country the modification is done in close cooperation with university institutes. In Germany in detail are available:

○ machines and tools (KTBL)	2.500
○ mineral- (producers) and organic- (ZALF) fertilizers	3.000
○ seeds (ministry - 150) and varieties (12.000 - EC)	20.000
○ yield and seed-amounts (ZALF, experts)	1.000
○ herbicides, fungicides, insecticides (producers, experts)	850
○ growing methods in detail for different plants	500
○ Public data like post, bank, communities etc.	70.000

The above model suddenly offers total new dimensions, e.g. in agriculture we could developed a system where with just one click one can drag and drop and everything necessary is done: “Here I plan to grow this type of crop”.

Location and expert information is linked automatically to the selected field. Cooperation with expert groups in different countries modifies the expert model to the local needs. The expert methods go so far that e.g. - to grow wheat or maize means to have a tractor for this cost and effort per hour, you have to do fertilization with this equipment and this amount of fertilizer etc. etc.; well educated farmers can overwrite the experts know how and build up their own schedule. Unlimited numbers of detailed calculations or activities can be done per click as in the following example shows:

- the base for a later print out of the thematic map is build
- the whole planning process is done, can by day by day transferred to mobile equipments, the actual situation comes back from the PDA/pocket PC into the system
- a target/actual comparison can be done automatically
- the business calculation of the field is done with all details of the expert system; if the user does not like the data he can modify the system according his targets or groups of customers decide to build up their own expert information system
- the data for documentation is set and can later be transferred to buyers organizations according to the EU laws for food traceability
- a unique area code – patented - allows later to (geo)trace back in detail where the products came from
- an integrated EUREPGAP interface sends data to the server
- the embedded expert data for a nutrient balance allows calculation per field and a transfer to the water boards acc. EU water framework legislation



- when the system is handled as an advisory system for complete regions or at large farms the complete logistics are prepared automatically and the data can be transferred to mobiles harvesting units to guide them as well as they will send back information to the central planning group
- All base data is available to start with precision or virtual farming tools on top of these applications.

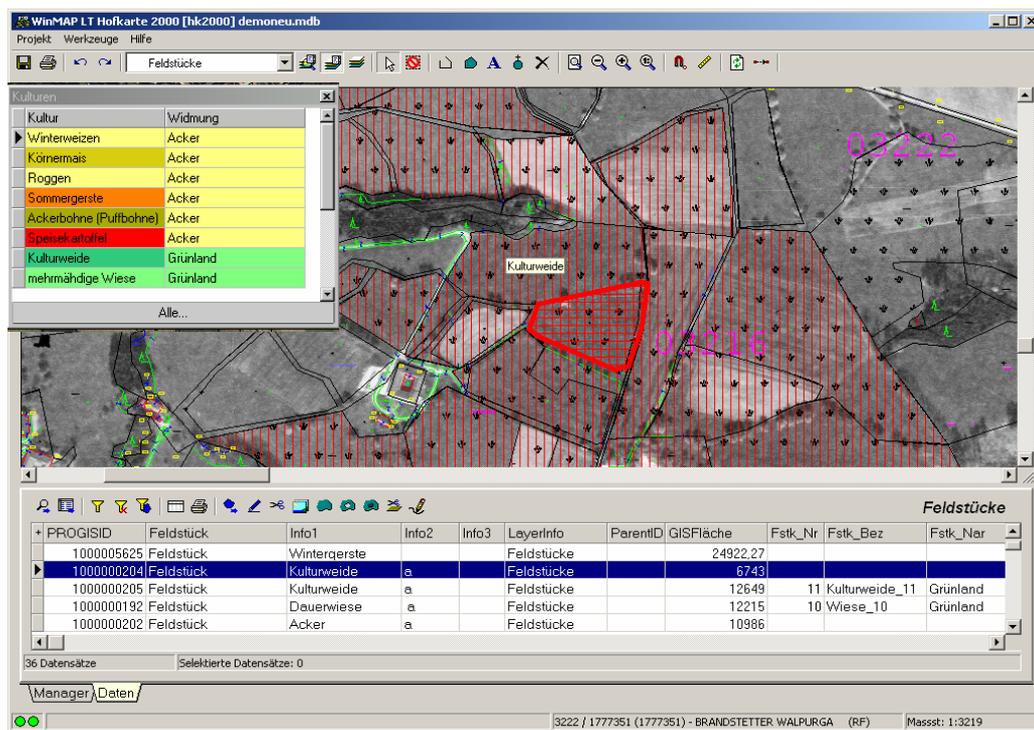


Abb. 1: The new patented design shows the integration of 4 elements:

- geography as hybrid GIS, system and functionalities are structured acc. customers needs
- database that can be any database or application that understands COM technology
- time and time related activities with an own patented time and activity management system
- related expert information handled in an own database upgradable easily via internet

This agri sample shows, what the GIS technology is really able to do, but only if

- GIS and time management and expert systems are integrated
- Technology integration easily can be implemented
- The GIS is able to be used by “tractor drivers” or in general by everybody – they are the ones who finally decide if the system works or not
- The complete business process has to be understood, it is not only a question of the maps

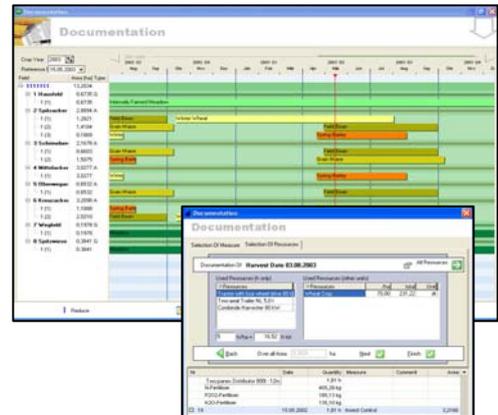


- The chain members have to be embedded into the system to get data for their use – more in depth understanding is necessary
- Service, hotline etc. has to be build up to guarantee fast customer support
- Local partners have to be integrated – only they understand local needs

Integral solutions for the agriculture

DokuPlant LT

The good Quality of food is essential! The European legislation supports these requirements! The learning effect came from the problems with BSE, salmonellae, herbicides etc. **Documentation and tracing** of products is obligatory in Europe acc. Documentation legislation as well as acc. Hygienic and cross compliance legislation



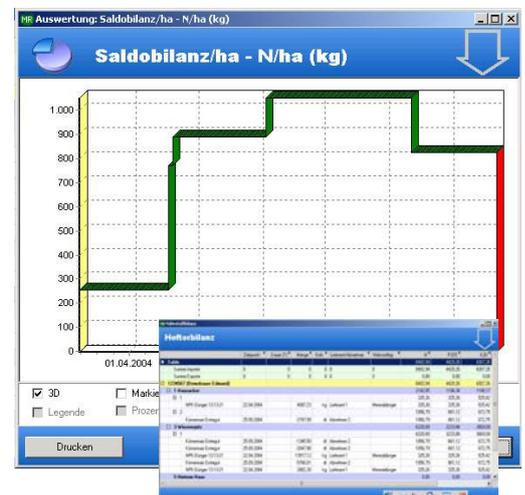
DokuPlant Professional

The number of farmers will be again reduced during the next years (e.g. Germany –30% within the last 7 years). In general we can assume a reduction of approx. 35% till 2015. This means that the existing farmers become bigger (lease, buy) and have bigger needs for agro business tools to perform better, in other words **to calculate more and better!**



DokuPlant Soil manager

The use of fertilizers and/or herbicides has to be optimised in the near future. One main reason is the availability of high quality water. The EU legislator regulates it within the **water framework legislation** - to do balance sheets for each field and farm every year as well as doing humus balances. In the future we expect the need for energy balances, where we prepare answers already yet as well as answers for integrated soil investigation with fertilizer recommendation and optimisation.



The business impact on the production coming from abroad as well as from the many new duties and responsibilities for the agriculture/forestry, related to ecology, sustainability, water quality/-quantity, diversity, nature protection, landscape preservation, prevention of hazards, recreation etc., force to think in larger units but also nevertheless one must not forget and accept the significance of details.

Also pressure for more cooperation will be building up within farm- or rural management. Condition for the use of many of the technologies and solutions given below, is the installation of regional platforms (see also „advisory systems“ above) that are able to integrate these new technologies as they are available today:

- **DokuPlant logistic modul:** cultivation, maintenance and harvesting with integrated mobile solutions, SMS / GPRS / UMTS services, ISO interfaces etc.
- **DokuPlant precision farming module** with integrated ISO-and CAN-bus systems but also covering lots of intensive cooperation with machine producers
- **DokuPlant virtual farming module** for combining “virtual” larger fields to overcome the European farm size problem but leave the farmers to stay owners of their ground
- **DokuPlant-GIS tools like** Isolines, GPS-protocols etc.

DokuPlant Interfaces:

To be able to integrate all the above mentioned modules, resp. the produced data, into farm machines and tools, **interfaces** are as well necessary as being able to transfer the collected data into pre- or post- processing industries (agro product buyers, food industry, fertilizer- and herbicide industry, crop producers etc.); today available interfaces are able to integrate

- datalogger and palm computers
- CAN- and ISO bus for tractors, accessory equipments, self propelling machines
- Sensors for meteorology, water, soil data
- GPS/dGPS data or in the future Galileo data
- EUREPGAP and other collectors database
- governmental organisations interfaces



PROGIS modules for integrating rural elements

Besides the agro application PROGIS provides as well a range of solutions with GIS integration for the sectors of forest, commune and utility:

- **FORESTOffice**: forest inventory, forest logistics
- **VILLAGEOffice**: for community planning, building authorities etc.
- **UTILITYOffice**: for water-, waste-water-, electricity- or road networks etc.

Solutions for single farmers and for advisory services

All modules are available for single farmers but also as client versions for advisory services as well as to cover complete regions. More laws increase the demand for advice. Solutions must be available from the political point of view for 100% of the farmers. From 2007 on advisory services will be co-financed from the EU: up to 1.500,-- €/farmer/year for using advisory services, up to 80% financed; local laws will be available)

Combinations of using either only advise or in addition a moderately priced PC with some of the software installed and do more expensive and complex modules at the advisory service, up to complete IT solutions for large farms including precision/virtual farming; any combination and cooperation with the regional advisory centre is available depending on regions / countries information about machines and their costs, fertilizers, herbicides and fungicides, sorts, prices and methods will be discussed together with local experts and afterwards fed to an expert database, which we will be build up. Today already 100.000 single elements are included. The whole model is controlled by a local administrator who has his own admin version; this administrator must be an IT expert and will be also able to modify input and/or output formats. With this admin version the regional PROGIS partner will be able to meet all necessary requirements regarding any fine tuning of the system.

Solutions for experts - WinGIS und FOMUMIIS

There are several else software products available to make data available in coordination with the farmers (ethics of use of farm data!!), like:

- **WinGIS** with versions and moduls as the GIS platform
- **WINGIS development environment** for IT developers who want to make their own applications with the help of development tools or



- **ProGIS Map Server** to inform the public or groups of users via internet or also to market only with high end tools the available services for farms. The software behind it is a WinGIS based internet solution.
- **FOMUMIS** is a tool that was developed together with the University for Life Sciences in Vienna/Austria. Linked with WinGIS is a database that easily can be modified by experts and makes it possible for any, also several ecological targets, e.g. avalanche protection, water retention, stone retention, recreation use etc. to work out an individual record system for field use or to take farm data and embed them into the system. The results can be calculated and presented in form of maps showing the different needs and the different degrees of performance. This allows in a second step to work out advice models as well as calculate the value of the achievements of targets for every farm.

Interested parties can get detailed info material on request. Book your place at the agro-forest-ecology future now!

- Mail (office@progis.com), fax (+43/4242/263327) or write to us (PROGIS AG, A-9500 Villach, Postgasse 6), chat with us (www.progis.com) or just call us right away
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