

Topcon in Agriculture

Topcon moves towards Agricultural market

In December 2006 Topcon Positioning Systems Inc. announced the acquisition of leading precision agricultural company, KEE Technologies Pty Ltd. KEE Technologies, an Australian-based company with over 25 years experience in agricultural electronics and applications, focuses on the precision agriculture market. The combination of KEE's innovative display and variable rate control technology with high quality GPS solutions enables Topcon to deliver innovative guidance and machine control techniques developed specifically for the European agricultural market.

Ray O'Connor, president and CEO of TPS, said, "The joining of these two world-leading technology companies – TPS, with its precise positioning technology and products, and KEE's fully integrated precision agricultural technology and instruments – will provide unmatched solutions for the global agricultural market."

Topcon has been providing products, software, hardware and applications for the agriculture market for more than 10 years. TPS products are used worldwide in the areas of data acquisition and management, machine control, precision land leveling, mapping, and water use management.



Precision farming

"KEE's technology in agriculture", O'Connor said, "meshed

with TPS positioning technology and our company's history in this important market segment, will allow the development of the most advanced and complete product portfolio for these emerging precision Ag and prescription farming techniques.

Topcon-Sauer Danfoss (TSD), our joint venture company, which provides approximately 70 percent of the worldwide steering hydraulics for tractors, should allow us to easily achieve our minimum target of 40 percent market share.

Couple all the obvious benefits from a technology point of view and combine this with the great employees, distributors and culture that KEE has, we see nothing but expansion opportunities for all involved. The companies, people and distributors are really a 'glove fit'."

Extremely compatible

Les Mann, CEO of KEE, said the corporate marriage is a "win-win-win situation for both companies, individual dealer networks, and customers around the world.



INDEX OF CONTENTS

X20 Controller:
the true virtual terminal

page 2

TruPath™:
Fully Integrated Auto-Guidance System

Map HP:
delivers 2-4 Inch accuracy "Pass to Pass" without the need for base stations

page 3

GPS/GLONASS technology:
Productivity from day one

GMS-2:
Handheld GPS with camera!

page 4

It's time.



continued

Precise positioning technology is changing the global face of agriculture." He said, "It's not enough to just plant and harvest crops. It is vitally important to increase pro-



ductivity at every step of the operation, while always being conscious of environmental concerns."

The global footprints of the two companies are "extremely compatible", Mann said. Both companies have staff and dealers throughout the world, including North America, South America, Australasia, New Zealand, and Europe.

European Agribusiness

In response to this move Topcon Europe Positioning B.V. has hired Matthew Bexson from Great Britain. Matthew will be Manager responsible for Sales in the expanding GIS and Agriculture markets.

Matthew has an academic background in agriculture and over seven years commercial experience working with numerous

manufacturers and distribution channels to deliver positioning and location based solutions to farmers and land managers across Europe.

Efficiency improving technologies

Matthew states: "Through my previous roles in Agribusiness and DGPS, I firmly believe that farmers of today are among the first in any industry to embrace new management and efficiency improving technologies.

Against the backdrop of low commodity prices and the need for increased environmental awareness of recent years, both the fi-



nancial and practical management benefits of "precision farming" techniques and steer assist solutions has become abundantly clear. It is now my aim to further

establish Topcon's reputation as a technology leader in this exciting and emerging sector."

X20 Controller

X20: the true virtual terminal



Farmers familiar with KEE Technologies' X10 and X15 models will be delighted by the latest addition to the range. The new X20 model is a true virtual terminal, with a super-bright color touch-screen that is 70 percent larger than the X10 and X15 even though the actual high-impact enclosure still measures only 7.4 in x 9.8 in. x 2.7 in. to fit easily inside the cab. Most notably, new software and connection capabilities in the X20 provide tremendous cross-platform flexibility and gains in site-specific and variable-rate application.

Functions include automatic steering; satellite guidance and up to five bin/tank one-pass variable rate seeding/planting applications including granular, liquid and NH3 control.

The system is capable of handling up to 30 section auto-boom shut-off controls. The unit can be easily moved to a harvesting machine for collecting yield data.



Easy data transfer

Using Windows XP software, the system can create 5-layer variable-rate maps with elevation maps and has the flexibility to add more features.

The software provides easy data transfer, including wireless networking with other X20s, digital devices and IT systems. The Zynx X20 also supports the industry standard ISO11783 CANBUS, making it compatible with the existing systems on a wide range of modern machinery.



The unit has multiple connections, with ports that include RS232, CANBUS, USB, COM2 (configurable to RS232 or RS485), VGA, Ethernet or LAN.

The device's combination of software and connectivity allows real time interaction with other digital systems or access through the Internet to potentially allow monitoring and control from one machine to another or even to and from a farm office.

Simple and accurate

The ZYNX® X20 has made true single pass and minimum tillage operations simple and accurate to implement. Prescription, application and yield mapping including elevation maps mean that crops



can be optimized for all inputs, except the weather. With the latest ZYNX® you can even send the application maps and records via electronic mail.

Easy-to-use and day/night touch-screen driven Precision Agriculture Applications

On-screen DGPS guidance system with virtual highway for straight, round and contour guidance. Op-

tional steering assist for increased accuracy and to make the job easier

Real-time and simultaneous control of seeders, sprayers, fertilizers

Real competitive farming

Savings in time, fuel, maintenance, chemicals, fertilizer, seed and other inputs, plus the additional pro-

ductivity by operating in a tighter timeframe day and night, mean that the adoption of Precision Agriculture is the only real alternative for competitive farming.

The ZYNX X20 Multi Functional Console - the next generation of Precision Agriculture Systems. Both the X15 and the X20 support the complete ZYNX Precision Agriculture applications from a single, rugged, cabin console.



Map HP

Map HP delivers 2-4 Inch accuracy “Pass to Pass” without the need for base stations

The new Topcon MAP-HP offers a full range of accuracy options from approx 1m if using single frequency DGPS services such as EGNOS, through to centimeter level when configured to operate dual frequency RTK. In addition, Map-HP brings DGPS accuracy down to sub-meter or decimeter-level when subscribed to OmniSTAR’s VBS or High Performance (HP) service.

The MAP-HP is a dual frequency receiver that incorporates many features for flexible operation, including Bluetooth, internal batteries, three COM ports and a rugged enclosure. The MAP-HP receiver system can be used in conjunction with the X20 display for machine guidance and or variable rate control and is compatible with most third party guidance systems. The Topcon Map HP is a premium

quality DGPS receiver that gives you the flexibility to receive free



services such as EGNOS, OmniSTAR’s satellite delivered VBS/XP & HP services or corrections from your own high accuracy RTK base station on the farm.

Definition of services:

- EGNOS is a free differential correction service available to users across Europe delivering repeatable accuracy in the region

of 1 – 3 meters, or 6 - 12 Inch Pass to Pass.

- OmniSTAR VBS – Is a highly reliable Virtual Base Station service available on most continents for a subscription fee. VBS will deliver better than ± 1 meter/ 3 ft, typically better than 30 cm/ 1 ft pass to pass accuracy and is ideal for most spraying, spreading and yield mapping applications.

- OmniSTAR HP – Is a high performance subscription service capable of delivering ± 10 cm/4” or better pass to pass on a wide area of operation. Ideal for auto steer and broad acre applications such as seeding, spraying and harvesting.

- Farm Base RTK – Offers long term repeatable precision for high accuracy auto steer operations in row crop and broad acre farming applications such as interrow cultivations, bed forming, laying drip tape irrigation etc. Typical positioning accuracy of ± 4 cm pass to pass can be achieved.

The MAP-HP can be purchased as a single frequency (L1) receiver for use with EGNOS or OmniSTAR VBS service, or may be upgraded to a dual frequency (L1+L2) configuration for use with the OmniSTAR-HP service or RTK.

MAP HP - One receiver delivers all your positioning needs

TruPath

Fully Integrated Auto-Guidance System

TSD Integrated Controls, a Topcon/Sauer-Danfoss joint-venture company, launches a fully integrated auto-guidance system for use in agricultural vehicle applications. With the new system, TruPath™, TSD Integrated Controls offers OEMs a single-source performance and positioning control solution that meets the end-user need for round-the-clock operations, more efficient use of machine implements, and multi-function control.

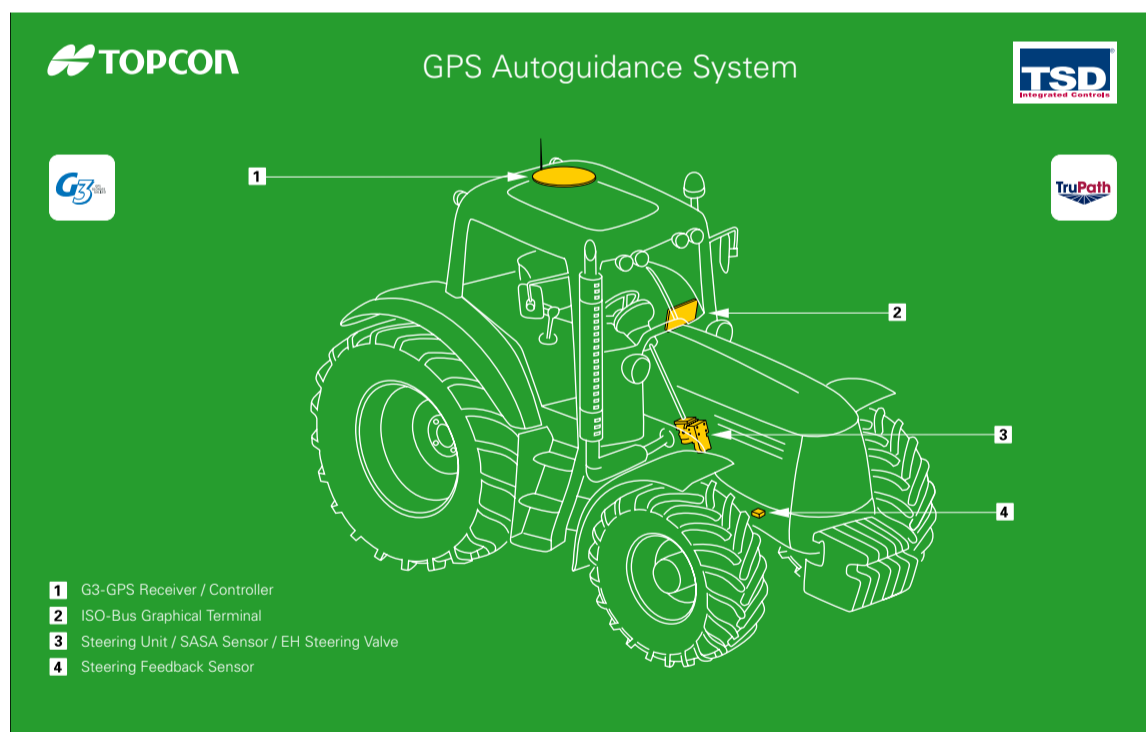
„With TruPath, the first-ever integrated auto-guidance system aimed at the agricultural machinery industry, we have brought together high-performance hydraulics and GPS-based positioning control in one integrated system“, says Michael Gomes, product manager, TSD Integrated Controls. „OEMs will no longer have to spend time on in-house retrofitting to equip their tractors or combines with the positioning equipment farmers want. We have done the complicated engineering work already,



thereby saving time and money for the OEMs“.

New possibilities

For farmers, GPS auto-guidance opens up a range of new possibilities. Following a range of set coordinates, GPS systems offer fast, accurate, and repeatable performances that allow for very efficient use of wide machine implements. The technology also enables farmers to work in low-visibility conditions or during the night, thereby avoiding costly time-losses.



Another advantage is multi-function control. As steering is done automatically, operators can focus on the control of machine work functions and carry out tilling, sowing, and spraying operations in a single pass.

Longer uptime

The TruPath system offers all of the above and more. It provides longer uptime and is more accurate than any competing auto-guidance system. The reason is that TruPath not only tracks signals from the 24 U.S.-operated

GPS satellites, but also from the 9 GLONASS satellites launched and run by the Russian government.

This means that TruPath has access to 33% more satellites than conventional systems which – depending on geographical location – often experience downtime due to missing satellite signals.

33% more satellites

„One of TruPath’s most remarkable features is its ability to track

33 percent more satellites than other systems currently available“, says Gomes.

„It takes simultaneous signals from eight satellites to calculate vehicle position with centimeter accuracy. With conventional positioning systems – able to receive signals from GPS satellites only – there will be times each day where the receiver has less than eight satellites in view.

The result is vehicle downtime or, at best, inaccurate positioning data. TruPath eliminates this problem.

Receiving signals from both GPS and GLONASS satellites at the same time, our system offers the highest degree of accuracy and 24-hour uptime, regardless of geographical position.“

Seamlessly integrated

The TruPath system consists of a receiver that detects and decodes GPS and GLONASS satellite signals to accurately calculate vehicle position.

An on-board computer with detailed steering and mapping software processes the available positioning data and sends it to a PVED-CL steering controller and SASA wheel position sensor.

The PVED-CL controller, mounted on a PVG 32 proportional valve, controls oil flow to the cylinders and thereby vehicle direction. Everything works automatically – hydraulic components and positioning equipment seamlessly integrated.



Productivity from day one

Get the highest possible productivity from your manpower and equipment with Topcon's AGS Agriculture GPS System. The new AGS-100 land leveling system makes endless productivity a reality. Everything is controlled from the operator-friendly AGS-C System Five 3D control box. Survey the field, create a cut/fill field design map, and begin grading without leaving the cab. If desired, the survey data can be saved to a CompactFlash® card for more detailed farm design work with the new AgForm-3D PC office software package.

Best of all, the AGS-C control box is not only compatible with your existing Topcon laser system, it's field upgradeable so you will be able to keep up with future innovations in all your precision farming applications.

Efficient and consistent

With AGS-100 you can automatically survey fields in minutes, right from the cab. Turn on the steering guidance light bar for more efficient



and consistent survey patterns. After surveying you can just set in your desired field slopes, or let the AGS-C control box accurately calculate the best-fit slopes which can reduce your yardage more than 10% vs. traditional laser survey and hand calculated slopes.

Design the field

Fields warped too much for laser control? With AGS-100 GPS controlled leveling you can still get the irrigation and drainage benefits that come with leveling for those

fields not suitable for traditional laser control.

Using AGForm-3D software, you can design the field to retain the natural slopes but smooth out the highs and lows that impede water management and cause drainage problems. Or just level the sections that are causing problems.

AGS 100 Features:

- Increase productivity and efficiency
- Survey and design your field right from the cab
- Most advanced GPS technology available
- Upgradeable to meet your future precision farming applications

Handheld GPS with camera!

Any Geographic Information System (GIS) is a computer-based tool for mapping and analyzing Earth information. A GIS captures, stores, checks, integrates, manipulates, analyses and displays data specifically related to positions on the earth's surface. Typically in agriculture, GIS is used for the creation and handling of maps of one kind or another. GIS systems are used for Agricultural data acquisition, i.e. Land parcel measurements for IACS, Forestry and Agronomy etc.

These maps are represented as several different layers where each layer holds data about a particular kind of feature. Each feature such as boundary, soil type, weed infestation etc. is linked to a position on the graphical image of a map. Layers of data are organized to be studied and aid management decisions.

GIS is used by people and organizations ranging from Land managers to National Agriculture Ministries, Town planners and local authorities, Public Utility managers and environmental bodies etc.

Accurate information

Probably the most important component of a GIS is the data capture process. Recording accurate positional information to create GIS datasets is generally in conjunction with the use of GPS.

Topcon has many years experience delivering a complete range of dedicated GIS receivers from



backpack solutions to a completely integrated GPS+ handheld.

Small hand-held receiver

With a rich history in positioning innovation, Topcon is leading the way with new, ground breaking technology in the field of GIS Mapping systems.

In a world's first, Topcon engineers have incorporated our industry leading dual constellation satellite tracking into a small hand-held GPS receiver, the new GMS-2.



This innovative new system also provides an integrated electronic compass and digital camera powered by Topcon's revolutionary imaging technology, offering the ability to take and store pictures and perform offset measurements by taking stereo pictures of the object.

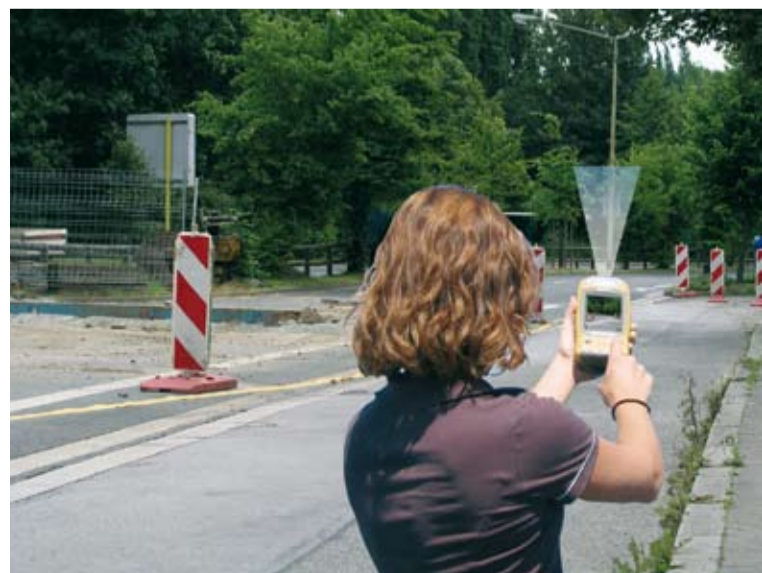
Real time DGPS

In addition to being a stand alone mapping grade receiver, the GMS-2 can also utilize external correction services for real-time DGPS. The GMS-2 provides access to the EGNOS correction service as a standard feature.



Using its internal Bluetooth connection, the GMS-2 can be configured to connect to a regional GPS CORS network through a Bluetooth enabled cell phone.

When utilizing the optional Topcon BR-1 Coast Guard Beacon Receiver, the GMS-2 can correct its raw GPS location for real time location, mapping, and navigation applications.



Contact



Topcon Europe Positioning B.V.
Essebaan 11 · 2908 LJ Capelle a/d IJssel
The Netherlands
Phone: + 31 (0) 10 - 458 50 77
Fax: + 31 (0) 10 - 284 49 41
Matthew.Bexson@topcon.eu
www.topcon.eu

Editors: Dimitri Lambermont, Matthew Bexson
Concept, Design: Grafit Werbeagentur GmbH