Resource Magazine's

OUTSTANDING INNOVATIONS 2002

AE50 2002

Products winning the 2002 AE50 awards represent the cream of the crop developed throughout the world for the agricultural, food and biological systems industries.

The innovations highlighted in this issue were chosen from numerous entries in the competition sponsored by *Resource*. The judges who chose the winners represent all factions of the agricultural, food, biological and related systems engineering professions. The expert panel selected the best of products first introduced to the marketplace during 2001. These products are expected to save producers time, costs and labor while improving user safety.

Problem solving is a major goal in designs whether one is developing a better way to spread manure, water a golf course or monitor weather conditions. Environmental concerns must also be factored in while keeping production and operating costs low.

The annual AE50 program has been honoring engineering achievements for more than a decade. Past winners include companies of all sizes throughout the world.

Many of the new ideas are patented and their names trademarked. Some may become household words in the future. Others will be improved upon as technology advances.

From improved tractors and implements to computer software and high-tech electronic measuring devices, the 2002 AE50 winners cover a gamut of devices. The AE50 is the only awards program of its kind to reward companies for developments in specific areas of agricultural, food and biological systems.

For information on how to enter next year's competition, contact Sandy Rutter at 616-429-0300 ext. 345 or rutter@asae.org.

Information on the AE50 and *Resource* magazine is also available on the ASAE Web site at www.asae.org.

Compact utility tractors adjust transmission speed to changing loads

The John Deere 4000 TEN Series compact utility tractors include nine models between 14 and 40 PTO horsepower (10 and 30 PTO kilowatt) with two new transmissions. The eHydro™ electronically controlled hydrostatic transmission maximizes productivity with the standard LoadMatch™ function that adjusts the transmission speed in response to changing loads. The ePowrReverser™ transmission allows direction changes under load without clutching via the reverser switch located near the steering wheel. The hydraulic wet reversing clutches are electronically controlled and the operator can select the aggressiveness of the direction changes from two settings. The 14 PTO horsepower (10 PTO kilowatt) 4010 features an isolated engine and low-noise level. On the 4210-4710 models, a right-hand fender console contains easily reached switches for control of the MFWD, PTOs and cruise features. The iMatch™ quick attach system, when used with any category 1 implement built to ASAE S278.6, allows easy attachment and removal of implements from the tractor seat.

John Deere Commercial Products
Grovetown, Georgia, USA; 706-868-4041

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Mechanical olive harvester handles fruit with less bruising

The Korvan Model 5000 Olive Harvester is a mechanical alternative to tree fruit harvesting over hand picking for the oil- and fresh-market olive industries. The harvester shakes fruit from one side of the tree while continuously moving forward alongside the tree rows. Shaking heads are controlled by one operator, while the driver adjusts the catching drape belt under the tree. The most effective harvesting is done using two harvesters that are mirror images of each other, harvesting together on each side of the tree row. The Korvan Model 5000 harvester is able to pick and convey the olives into storage bins with less bruising damage to the olives and less foreign material in the bin than with current hand-harvesting methods.

Korvan Industries, Inc.
Lynden, Washington, USA; 360-354-1500

Integrated system mechanizes transplant of tree-crop seedlings

Seedling Transplanter Ver-1 is an integrated machine system used with a four-wheel tractor having at least 85 horsepower (63.4 kilowatt) to field transplant oil-palm or any tree-crop seedlings. The design configuration includes the main chassis, seedling bin, planting assembly, operator compartment and associated hydraulic system. Two operators are required: one drives the tractor-transplanter in the field while the other one on the transplanter operates the hydraulic-control system to integrate all operational activities. The machine is capable of preparing the planting hole, placing and covering the seedling in the prepared hole, and then compacting the soil around the planted seedling. With oil palm seedlings, this mechanized system has a planting capacity of 99 seedlings/man-day or 1.53 acres/man- (0.62 hectares/man-) day as compared to 0.69 acres/man- (0.28 hectares/man-) day or 45 seedlings/man-days with the manual transplanting system, an improvement of 2.2 times. The estimated planting cost under this mechanized system is US$ 0.55 per seedling as compared to US$ 0.59 per seedling under the manual system, a reduction of 6.77 percent.

Universiti Putra Malaysia
Selangor D.E., Malaysia; azmiy@eng.upm.edu.my

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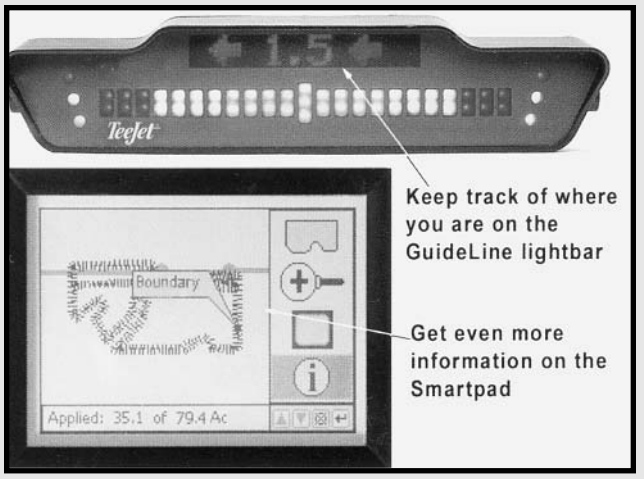
Operators can electronically adjust picking height of cotton from cab

The John Deere 9986 Cotton Picker is available in 4- or 6-row configurations in row spacings from 30- to 40-inches (76- to 101- centimeters) and various skip row patterns to provide flexibility and productivity. It is equipped with a 325-horsepower (242-kilowatt), 8.1-liter John Deere POWERTECH® engine, John Deere Pro-Series picking units, 150-gallon (568-liter) fuel tank, 80-gallon (303-liter) lubrication tank, and 275-gallon (1,041-liter) spindle-cleaning solution tank. It can harvest up to three bales per acre (0.40 hectare) of cotton at 4.0 miles per hour (6.4 kilometers per hour). The 9986 offers several new features that improve harvest efficiency, productivity and operator comfort. An operator station provides a comfortable work environment with increased visibility. The electronic-unit-height-control system offers operators the option of adjusting unit-picking height and response rate from the cab. The 9986 also includes automatic basket auguring, which maximizes trips through the field.

John Deere Des Moines Works
Ankeny, Iowa, USA; 515-289-3243

Easy-to-use guidance system improves efficiency



The TeeJet GuideLine GPS-based parallel guidance system from Midwest Technologies is designed to improve the efficiency of field operations through improved swath management. The GuideLine system employs a dedicated Windows CE handheld computer as the user interface. The handheld makes configuration and data management intuitive, with familiar menu-based operations. The handheld computer's display also provides real-time maps of the work operation. Recorded maps can also be stored to the computer's data card for future use. In addition to the traditional row of LED lights used for steering guidance, the GuideLine lightbar also includes a textual data display. The operator can view real-time work-related data, including track error, swath number, accumulated area, vehicle speed and others. The operator can use this information to monitor his work without looking away from the direction of travel.

Midwest Technologies
Springfield, Illinois, USA; 217-753-8424

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Compact, tapered tractor cab limits orchard limb damage

The Massey Ferguson Model 4300 Series Orchard Cab Tractor is for orchard growers who require a tapered, low cab for efficient operation between rows, minimizing crop loss and limb damage. The compact design has been engineered to give this tractor the lowest possible height and smallest profile without sacrificing cab space, operator comfort or ROPS protection. The cab design provides operators added protection in lieu of personal protective equipment for pesticide application. The HVAC system, which incorporates primary and recalculation filters, complies with ASAE S525 and EPA Worker Protection Standards for enclosed cabs. The tractors are available in three power ratings – 85, 90 and 99 PTO horsepower (63, 67 and 74 PTO kilowatt). Secondary markets include hop farmers in Europe.

Massey Ferguson, a wholly owned subsidiary of AGCO Corp.
Duluth, Georgia, USA; 770-813-6056

Improvements to planter's systems increase accuracy, speed

The 1770 NT 16 Row 30 MaxEmerge Plus Planter from John Deere is a front-fold, three-section flex planter. The new frame, markers, and fertilizer and hydraulic systems are some of the many improvements over the previous model. The frame configuration has a transport width of 12 feet (3.7 meters), wing flex of +/- 21 degrees, a 4½-foot (1.4 meter) shorter hitch while planting, and 22 inches (56 centimeters) of under-frame clearance during transport. The Tri-Fold marker enables the working width of the planter to be 8-feet (2.4-meter) narrower, allowing operators to move closer to fence rows and field edges. The marker cylinder also resides above the arm, free of residue and soil. The fertilizer system uses an on-board 600-gallon (2,271-liter) tank and can tow an additional 2,000-gallon (7,571-liter) nurse tank. The flow-divider option provides a more accurate and reliable distribution system with less maintenance. A simplified hydraulic system and frame-control box are designed to increase customer satisfaction with improved function.

John Deere Seeding Group
Moline, Illinois, USA; 309-765-7592

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Electronic twine wrapper automates many round-baling functions

The Electronic Twine Wrapper (ETW) is a new, easy-to-use in-cab computerized control system developed for the Case IH RBX Series Round Balers. The ETW allows the operator to visually know when to shift the baler to the left or right side of the windrow while traveling the field. Proper feeding of the windrow into the round baler builds well-shaped bales. For wrapping, the operator selects from four pre-set wrap patterns to set the desired number of twine wraps, and the system retains the selected wrap pattern until changed. Each bale is automatically wrapped when the predetermined diameter has been reached. The system has manual overrides and diagnostics make the system reliable and easy to maintain.

CNH
New Holland, Pennsylvania, USA; 717-355-3568

Easy-to-use, lower-cost weather station meets variety of research applications

The HOBO® Weather Station uses innovative plug-in smart sensors that the data logger automatically recognizes without complicated wiring, programming or calibration. The rugged smart sensors and mounting tripods can be easily configured to obtain research-grade measurements at less than half the cost of previously available systems with comparable performance. The HOBO Weather Station can be user-configured with any combination of up to 15 channels of sensor inputs and can log more than 500,000 measurements. A range of tripods and mounting arms are offered so that users can scale the system to their needs – compact configuration for microclimate monitoring, or two- and three-meter tripods with sensors positioned to meet World Meteorological Organization standards. The entire system, including sensors, is powered for one year using only four AA batteries, so no solar panels or large 12-volt batteries are needed. Non-volatile memory retains logged data even if the system's batteries should fail.

Onset Computer Corp.
Bourne, Massachusetts, USA; 800-564-4377

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Mechanical citrus harvester increases productivity

The OXBO® Freedom Series™ 3220 Citrus Harvester is a self-propelled machine that works in pairs to harvest citrus fruit grown for juice. The citrus harvester has an automatic trunk sensing/sealing catcher table and an integrated conveyor/cleaning system. These features allow the harvesters to shake the fruit from the tree's branches, clean and discharge the fruit into a grove truck while traveling through the grove. As a continuous-travel harvester, the OXBO Freedom Series 3220 increases productivity and annual harvest capacity. Currently in the United States, manual laborers harvest more than 95 percent of all the processed oranges. The typical handpicking rate is 55 man-hours per semi-truckload. A pair of OXBO Citrus Harvesters is capable of reducing manpower to three to six hours per semi-truckload. This is an average labor productivity increase of 900 percent.

OXBO International Corp.
Clear Lake, Wisconsin, USA; 715-263-2112

Attach implements quickly, safely to tractor from driver's seat

Attach-Matic's Quick Hitch Systems Snap-On Model "AFT - C78AR" allows hooking and unhooking of farm wagons and four-wheel trailers safely, rapidly and directly from the driver's seat. A system comes in many different models and sizes to fit most tractors, balers, harvesters, farm wagons and four-wheel trailers. Attach-Matic can prevent accidents caused during hooking and unhooking operations because no one is needed to stand between machines to hold up the pole. A cord installed close to the driver's seat is pulled to release the hook and free the wagon's pole. The systems can be adapted electrically, if needed. Attach-Matic does not affect PTO operations. All of the Attach-Matic Systems are made of two main components out of high-quality steel. The attach installs on the tractor, baler or harvester, and the receiver on the wagon, four-wheel trailer or grain gravity wagon's pole. Strategic parts are cut out of tempered steel. An example of how the Attach-Matic aids farmers: one tractor can handle picking up operations, or two tractors can pick up their own round bales at the same time.

Attach-Matic, Inc.
Ste-Sophie d'Halifax, Quebec, Canada; 800-230-9077

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Tractor's systems combine to increase harvesting capacity

The New Holland CX840/860 Super Conventional Combine is a new-design combine harvester. The design team for this project created different sizes of sub-systems to provide an increase in capacity and productivity. The CX cylinder and concave have been made larger to provide smoother flow and increased separating area. The rotary separator offers additional separating capacity. The full-width grain pan and self-leveling cleaning system reduce grain loss when working both on level ground and on slopes of up to 17 percent. In the cab, the CX InfoView™ monitor is completely movable so the operator can select the most comfortable position and program desired functions. The electrical/electronic system features an electric shift for the transmission, and a header-height system provides header flotation that offers both stubble height and pressure compensation modes. The CX rear-axle design allows the rear wheel to tuck forward for a shorter turning radius and maximum productivity.

CNH
New Holland, Pennsylvania, USA; 717-355-3331

Reliable, fuel-efficient tractor designed for farmers in developing countries

The John Deere 6003 Series tractor design is focused on simplicity of operation, ease of service, outstanding fuel efficiency and manufacturability in developing countries. Four models – 6103, 6203, 6403 and 6603 – are produced in Mexico. All models are configured as open operator station tractors with a 9F/3R transmission in collar shift and synchronized versions. The 6603 model has a six-cylinder, turbocharged engine, while the other models have four-cylinder, turbocharged engines in both noncertified and Tier 1 certified configurations. Tractor power levels from 80 to 110 DIN PS are offered in the above models. A multinational team networked across many locations used the latest technologies to create the design and delivery of this tractor. The 6003 Series tractors are designed with specifications that appeal to a variety of applications – general tillage, livestock, dairy, haying, governmental, commercial, corporate operators and many more.

John Deere Product Engineering Center
Waterloo, Iowa, USA; 319-292-8680

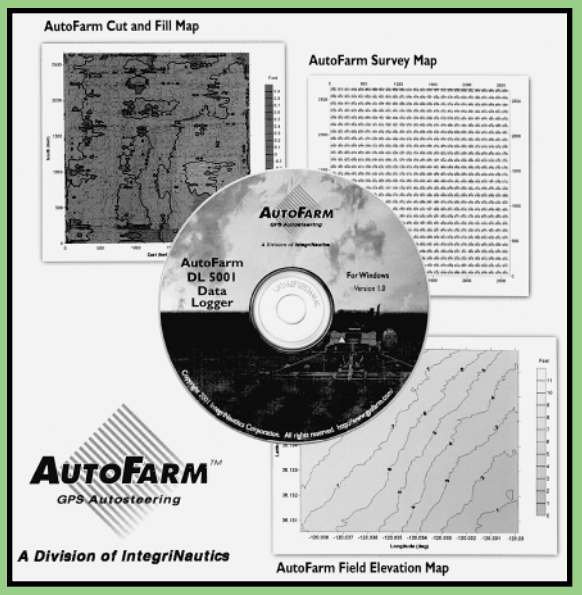
AE50 OUTSTANDING INNOVATIONS 2002

Universal joint transmits high horsepower

The 77 Series Universal Joint is capable of transmitting a relatively high horsepower. More than 100 different models of tractors are in the field with greater than 200 horsepower. Forage harvesters, shredders, tillers and waste-handling implements have not been able to fully use this available power due to drive train or other restrictions, and instead have been designed to limit power to prevent damage. This product can be used as a single or double joint, or in a telescoping driveline. The 77 Series driveline is the first to meet the ASAE S331 Category 8 heavy-duty requirements including the telescoping members. This product allows higher continuous power, at least 270 horsepower (200 kilowatt) at 1,000 revolutions per minute, with reduced bearing thrust loads. It allows some implements to be designed without torque limiters, which simplifies machinery and improves reliability.

Weasler Engineering, Inc.
West Bend, Wisconsin, USA; 262-338-2161

System allows growers to collect, download own field-elevation data



The AutoFarm GPS 5001 Data Logger allows growers to collect elevation data from the AutoFarm Guidance system and download it into a Windows computer. The data is recorded on a standard flash disc with 48-MB capacity. As the guidance-system-equipped tractor moves through the field, field elevations and the coordinates of each elevation point are recorded. The data is more accurate than conventional laser surveying, which is usually based on a 100-foot (30-meter) sample interval. The GPS 5001 Data Logger collects data at a much finer interval in the course of normal field operations, and unlike lasers, it accounts for the curvature of the earth to eliminate a major error source. With the software included with the system, a variety of elevation maps can be created giving the grower information that can be used for leveling purposes or to determine if the field needs to be releveled.

AutoFarm, a division of IntegriNautics Corp.
Menlo Park, California, USA; 650-833-5600

AE50 OUTSTANDING INNOVATIONS 2002

Parallel tracking system uses tones to soundly reduce overlap

GreenStar Parallel Tracking is a DGPS-based parallel swathing system. Parallel Tracking consists of the same GreenStar common components that are used with Combine Yield Mapping and Monitoring, Field Doc, SprayStar, Accudepth, SeedStar and Map Based Seeding. Parallel Tracking is available for both John Deere and other equipment. This system can also be used on any vehicle with a 12VDC-power supply. Parallel Tracking has the flexibility to utilize SF1 or SF2 dual-frequency correction signals from the John Deere StarFire network or the government sponsored WAAS signal. Parallel Tracking is accurate to a level of ±4 inches (10 centimeters) in pass to pass applications 95 percent of the time, where pass to pass accuracy is defined as the level of accuracy in adjacent passes that occur within 15 minutes of one another. The system offers audible tones for correction information, which frees the operator from looking at the display. A special turning view assists the operator in locating the next pass while turning at the end of the field.

John Deere Ag Management Solutions
Urbandale, Iowa, USA; 515-331-4750

Tractors' automatic controls save time, improve efficiency

AGCO® LT, RT and DT Series tractors, 70 to 225 PTO horsepower (52 to 168 PTO kilowatt), feature technologies such as the Auto Quadrashift®, Spool Valve Management System (SMS), and Trailed Implement Control (TIC) to help farmers increase productivity. Auto QuadraShift® simplifies operation by eliminating the manual functions normally used to operate the 32 forward x 32 reverse transmission. With PowerControl Shuttle, the operator controls direction and four-speed power shifts for on-the-go gear and range changes. The auto feature changes powershift speeds automatically as the working conditions of the tractor change. The SMS with Datatronic controls two electro-hydraulic proportional valves allowing precise flow rate and valve kick-out timing adjustment for more productive implement management. TIC is also available to automatically adjust the working depth of the trailed implement, enabling full draft control.

AGCO Tractors, a wholly owned subsidiary of AGCO Corp.
Duluth, Georgia, USA; 770-813-6056

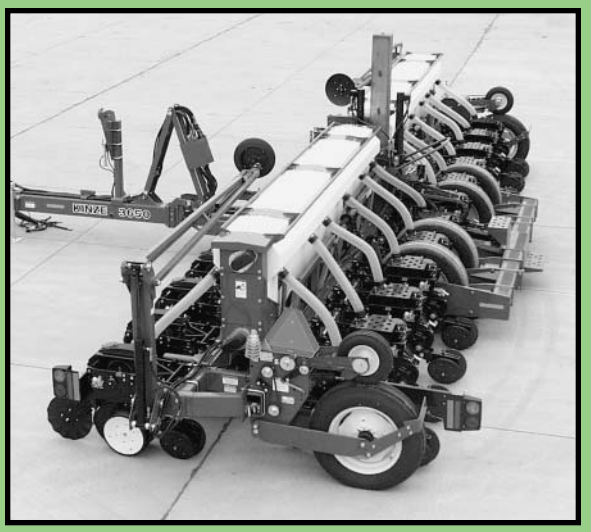
AE50 OUTSTANDING INNOVATIONS 2002

Injection system aerates soil consistently, uniformly

Mazzei AirJection® Irrigation, in conjunction with sub-surface drip irrigation (SSDI), continually delivers a specific amount of air to the root zone during irrigation. When water enters the AirJection® unit, air is drawn in, entrained in the water, and is then uniformly distributed to the plant roots through the SSDI lines. The entrained air then moves through the soil with water as the carrier. Past attempts to aerate the root zone typically involved injecting air directly into the soil with compressors, or air alone was pumped through SSDI lines. Using these methods, the air was not distributed effectively. The patented Mazzei AirJection® Irrigation aerates water delivered to the root zone for increased root growth and yields.

Mazzei Injector Corp.
Bakersfield, California, USA; 661-363-6500

Planter reduces fill time with bulk-seed holding, distributing system



The Model 3650 planter from Kinze Manufacturing features a bulk-seed holding and distribution system. The two centrally mounted bulk seed tanks are mounted on a patented TWINLINE frame and distribute seed to rear-mounted planter units and front-mounted, push-type row units. A system of slow-turning, brush-type augers built into the tanks elevate and distribute seed to individual row-unit-mounted seed meters. The machine is designed to take advantage of bulk delivery seed and assist large acreage producers in search of maximum efficiency at planting time. Based on the model 3600 planter, the model 3650 features the same transport and unit options, with the addition of increased planting productivity through reduced seed-hopper fill time. Seed placed in the bulk tanks is evenly distributed to all rows until all seed is planted.

Kinze Manufacturing
Williamsburg, Iowa, USA; 319-668-1300

AE50 OUTSTANDING INNOVATIONS 2002

Rugged water temperature monitor can log, offload data at same time

The HOBO® Water Temp Pro monitors underwater or soil temperature. It is waterproof to 100 feet (30 meters) in fresh or salt water and can be used for extended deployments at up to 122°F (50°C). An optional rubber boot is available for added durability in especially harsh stream or river conditions. The HOBO's high-speed infrared port allows data to be offloaded in less than 30 seconds, even when the logger is wet. A new communications protocol allows data and logger status to be read out even while the logger continues to log. The infrared port is opposite the mounting hole end for easy data offload while still tethered. A 12-bit A/D and precision components provide ±0.36°F (±0.2°C) accuracy across a 32 to 122°F (0 to 50°C) range. A temperature-compensated real-time clock provides better than ±1 minute per month time accuracy. A factory-replaceable battery provides power for up to six years.

Onset Computer Corp.
Bourne, Massachusetts, USA; 800-564-4377

Material handlers lift ag products to new heights

The 3000 Series Telehandlers from John Deere are rugged, purpose-built material handlers, designed to offer agricultural customers new levels of performance, lift capacity and maneuverability. The 3200 has a lift height of 18.4 feet (5.6 meters) and a capacity of 6,173 pounds (2,800 kilograms) and the 3400 offers a lift height of 23 feet (7 meters) and a lift capacity of 6,614 pounds (3,000 kilograms). Powered by the John Deere 4045 PowerTech turbocharged engine, these telehandlers provide certified and constant power, high torque matched with low-fuel consumption and reliability. The ergonomically designed cab has low sound levels and high visibility of critical operational areas. The hydraulic system features a load-sensing system with constant flow pump and closed-center main hydraulic valve. The drivetrain is designed to match engine performance, featuring a torque-converter transmission for power-shuttle shifts supported by four-wheel-drive axles to place the power to the ground. Rear-engine mounting provides stability and counterweight for safety, while enhancing visibility. Three steering modes offer two-wheel, four-wheel and crab steer for maneuverability and simple steering-mode changes. Wheel alignment is easily adjusted from the operator position. Daily maintenance operations can be made safely from the ground with easily accessible service points.

John Deere
Lenexa, Kansas, USA; 913-371-8343

AE50 OUTSTANDING INNOVATIONS 2002

Check hill erosion with long-lasting structures made from small diameter logs

Forest Concepts' FlowCheck™ structures, manufactured from small diameter forest stems such as those produced by fuel-reduction thinning projects, provide hillslope erosion control on agricultural and forest lands. Wildfire burned area emergency rehabilitation (BAER) projects occur on thousands of acres a year in the western United States. The preferred hillslope erosion control materials are wood logs and all-wood slope stabilization structures. All-wood FlowCheck™ structures are an alternative to straw waddles and hay bales for erosion control. These structures are easy to install, last long and do not require staking in most conditions.

Forest Concepts LLC
Federal Way, Washington, USA; 253-838-4759

Tractor optimizes performance on tracks with new centerline design

The Challenger® MT700 Series tractors from Caterpillar® are designed to optimize tractor performance on tracks. This third generation of agricultural tractors – internally known as Gen III behind the first-generation tillage tractors introduced in 1986 and the second-generation row-crop tractors introduced in 1994 – feature a nearly 51 percent update in design content from its predecessor, and a 95 percent change in components. Under development for nearly four years, the Challenger MT700 Series tractor line represents the performance benefits of modern-day wheel and track tractors packaged in a new centerline design. The tractor line's numbering system – the MT700 series – retains the initials from the Mobil-trac™ system, introduced on the original Challenger 65 in 1986. This system paired the mobility of wheels with the tractive and flotation advantages of steel tracks. It also overcame the steel-track tractor's inability to move over paved roads.

Caterpillar®
Dekalb, Illinois, USA; 815-754-8351

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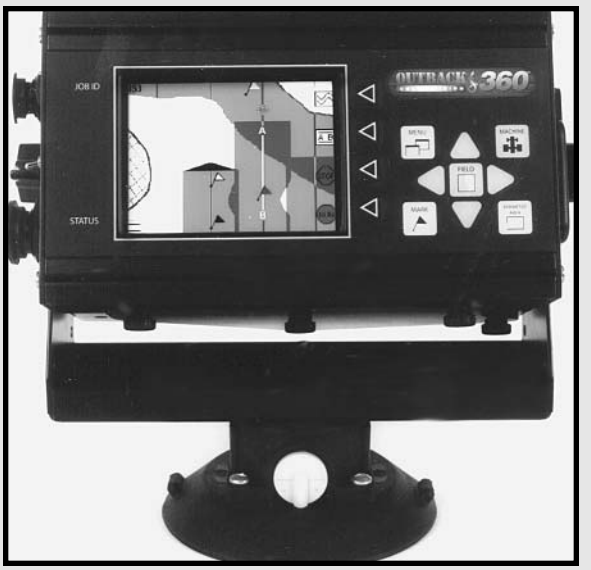
Field-mapping technology records, analyzes yield data

The Outback®360 from Outback Guidance®, a division of RHS, Inc. that focuses on GPS precision agriculture products, gives farmers real-time view of their work as it is being done. The Outback®360 delivers a high-resolution color image. This clear and detailed image helps the operator see the work as it is being done. The unit has mapping and provides job statistics on the fly to assist in managing fieldwork. In addition, it can easily record when changes in management occur during a job. For example, the 360 can track where different hybrids are planted within a field, critical for yield analysis. Installation in any cab takes less than 15 minutes. Shortcut buttons and simple messaging makes operation easy.

RHS, Inc.
Hiawatha, Kansas, USA; 785-742-2949 ext. 225



Innovative soybean and corn based composite material from John Deere

HarvestForm SMC (Sheet Molded Compound) and HarvestForm Structural Foam RIM (Reaction Injection Molding) from John Deere Harvester Works are alternatives to the petroleum based SMC and RIM materials for styling panels. In HarvestForm SMC and RIM, a portion of the petroleum based polymer is replaced by a soybean and corn based polymer. Using renewable resources in SMC and RIM composite materials on John Deere combines expands markets for farmers. The soybean and corn based material processes and performs the same as traditional petroleum based composite materials. HarvestForm styling panels provide numerous advantages over traditional steel styling. The continuous surface can be painted with an automotive-like finish. Rust and denting are eliminated, improving long-term appearance. HarvestForm styling panels also reduce part count, weight and assembly variation.

John Deere Harvester Works
East Moline, Illinois, USA; 309-765-2079 or 309-765-2193

AE50 OUTSTANDING INNOVATIONS 2002

Vegetable harvester simply smaller, lighter and lower cost

The Legacy 2440 green pea and lima bean harvester from OXBO International Corp. was developed to reduce the size and complexity of traditional high-production harvesters for vegetable crops. It is 25 percent lighter requiring only four tires. The ground drive uses mechanical axles, two-speed transmission and variable-displacement pump and motor to maintain optimum operating pressures, extending component life. The chassis is a fixed frame with only the threshing system on a leveling frame, again reducing complexity. Production capacity is maintained through a patented threshing design and higher road speed improving harvest-to-engine-hour use. This easy-to-operate machine is priced 20 percent lower than traditional harvesters.

OXBO International Corp.
Clear Lake, Wisconsin, USA; 715-263-2112

Tractor with rotating operator's station doubles versatility

AGCO Corp.'s FENDT™ Vario® Reverse Station Tractors can turn the operator's station 180 degrees in less than one minute. Tilt the steering column toward the seat and rotate the entire operator's station, including the steering wheel, dash, seat and armrest. Either direction, all controls are in the same relative position to the seat. FENDT features for these 160- to 240-horsepower (119- to 179-kilowatt) tractors include Vario CVT, cab suspension, and Variotronic terminal. The FENDT™ Reverse Station increases tractor use and return on investment by providing producers with a tractor capable of conventional tillage, planting, and haulage use and reverse operation. With reverse operation, the tractor can be used for snow blowing, forestry mulching, dozing, sweeping, as well as operating as a self-propelled mower conditioner, compost processor or forage harvester.

FENDT
Duluth, Georgia, USA; 770-813-6544

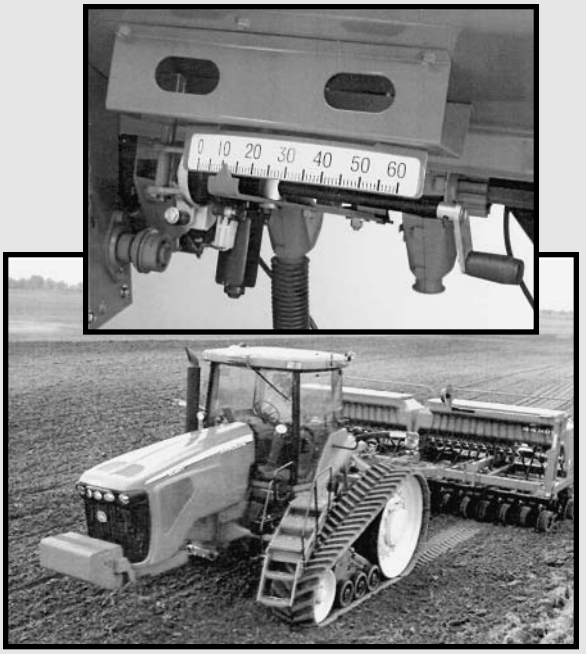
AE50 OUTSTANDING INNOVATIONS 2002

Tillage system improves seed bed while preserving soil

The Case IH 2500 Rip-Strip and DMI ecolo-strip'r 2500 provide a combination of deep tillage and no-till while addressing common no-till problems such as slow seed germination due to cool, wet seed beds or poor seed-to-soil contact. This one-pass operation combines a four-step system of components: a coulter to manage residue, a low disturbance shank and patented point to improve soil tilth, soil gathering disc blades to elevate the bed, and a soil conditioning system to reduce clods and provide a uniform seed bed. This system allows farmers to economically achieve an optimum soil environment while complying with residue retention guidelines set forth by the Natural Resources Conservation Service.

CNH
Goodfield, Illinois, USA; 800-727-4364

Electronic population control improves seeding accuracy



John Deere grain drills can now be equipped with the Electronic Population Rate Control (EPRC) system, which is designed to provide more accurate seeding and improved operator convenience. This system eliminates the need to stop and dismount the tractor to make adjustments to the seeding rate. Customers may also use EPRC in conjunction with a population monitor to more closely monitor and adjust seeding rates without stopping. The dovetail design of the control handle allows up to three controllers to be installed on multiple section drills for accurate calibration of each section. Mechanical and electronic overload protection protects both the grain drill and the rate controller from potential damage. The EPRC system can also be retrofitted to existing John Deere grain drills.

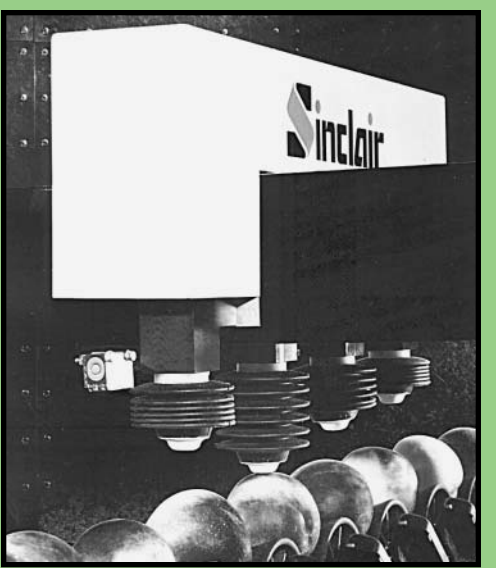
John Deere Seeding Group
Moline, Illinois, USA; 515-289-3260

AE50 OUTSTANDING INNOVATIONS 2002

Non-destructive firmness tester measures fruit quickly

The Sinclair International Ltd.'s IQ – Firmness Tester was developed to measure, non-destructively, the elastic property of produce. The system uses four low-mass impact sensors set in bellows and mounted over standard sorting equipment. A piezoelectric crystal is the active element that is squeezed between a small mass and the fruit surface. As the crystal is being deformed it produces a voltage profile that corresponds to the fruit firmness. As fruit rotates through the inspection area, four measurements are made and a final value is calculated. A firmness grade is determined and passed onto equipment sorting up to 600 fruit per minute. The system has been tested in three major UK re-pack operations supplying avocados. Research has been completed to adapt the system to inspect many other fruits such as kiwi, peaches, nectarines, tomatoes, etc.

Sinclair International Ltd.
Norwich, United Kingdom; 44 (1603) 726-400



Many options allow customers to customize tractor

New Holland's TJ Series 4WD Tractors come in two different chassis sizes and five different horsepower sizes to match a wide range of customer needs. The TJ275 and TJ325 use the smaller chassis and CNH 8.3 liter and 9.0 liter engines. The TJ375, TJ425 and TJ450 use the large chassis and Cummins QSX 15 liter engine. The TJ Series is available with many options to meet customer requirements including: two cab trim levels, a mechanical-shift or power-shift transmission option, several PTO and Three-Point Hitch options, and several hydraulic remote options, including Megaflow™ – which uses two independent pumps for up to 90-GPM hydraulic flow at seven electro-hydraulic remote valves. Also available are three scraper versions, which come with factory-installed scraper drawbars, tow cables and laser-leveling ready controls for earth moving applications. These features along with additional options give our customers a tractor with extreme power and productivity.

CNH 4WD Products Plant
Fargo, North Dakota, USA; 701-293-4400

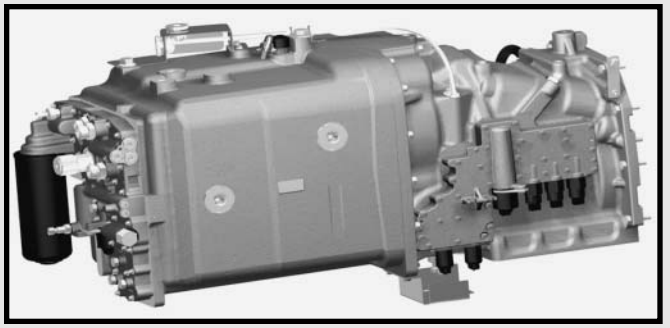
AE50 OUTSTANDING INNOVATIONS 2002

Zero-diameter mower incorporates tractor technologies for reliability, durability

The Kubota ZD21 turf mower was designed using high-end agricultural tractor technologies. Combining the final drive and twin-hydrostatic transmissions allows the integral drive system to be totally enclosed, eliminating potential oil-leakage problems. An efficient Kubota-built diesel engine with low-noise levels and high-power output powers the mower. Incorporated agricultural tractor technologies include a wet multi-disk PTO clutch, hydraulic mower deck-lift mechanism, oscillating front axle, mid-mount operator positioning and right-side control console. The mower is able to turn in a zero diameter and reaches a top speed of 10 miles per hour (16 kilometers per hour). These features are combined with a high back seat, taller arm rests, padded steering grips and a built-in front lift that allows for easy maintenance. This reliable, comfortable and cost-efficient machine is entirely designed and built by Kubota.

Kubota Tractor Corp.
Torrance, California, USA; 310-370-3370 ext. 1822

Variable transmission provides infinite ratio selections



The IVT (Infinitely Variable Transmission) for the John Deere 7000 Series Tractors combines the advanced technologies of hydraulics, electronics, drive trains, and vehicle control systems. This combination provides customers with improved productivity and comfort. Some of the advanced features and technologies include: stepless speed changes from 10.5 miles per hour (17 kilometers per hour) in reverse to 31 miles per hour (50 kilometers per hour) in forward; automatic load control and fuel economy operating modes (provides optimum engine and transmission speeds for the application without operator inputs); autoclutch (allows operation with throttle and brakes only /like driving a car with an automatic transmission); advanced high-efficiency bent-axis hydrostatic technology; advanced drive strategies to provide optimum vehicle performance for any application; full electronic transmission management providing optimum match to engine performance characteristics. This transmission is now available on the 7710 and 7810 Model Tractors sold in Europe.

John Deere Product Engineering Center
Waterloo, Iowa, USA; 319-292-8084

AE50 OUTSTANDING INNOVATIONS 2002

Row unit manages moisture, soil and nutrients for corn production

The DMI nutri-till'r 5310 is a machine that utilizes new proprietary row unit that manages residue, improves soil tilth, applies nutrients into the root zone, and forms a superior berm/seed bed – all in one pass and at faster operating speeds. It was developed to address the field performance problems of current strip-till practices in corn production while complying with Natural Resources Conservation Service residue retention guidelines of no-till. The product is intended to improve the production of no-till corn in areas with cool, wet spring seasons and where the soils are not heavily compacted and could use more nutrients. It also benefits farmers with highly erodible lands and sensitive watershed areas.

CNH
Goodfield, Illinois, USA; 800-727-4364

Tractor's transmission packs power

John Deere 9020 and 9020T Tractors feature a new power-shift transmission option. The new transmission is offered as an option on all models including the 9120 and is standard on the 9520 and the 9520T. The features of the new transmission are: 18 speeds forward, 6 in reverse; capable of neutral to gear shifts up to 13th forward; speed matching from 18th to 13th forward, power-shuttle shifting from 11th forward to 3rd reverse; automatic Powershift (APS) feature standard; electrohydraulic-controlled park brake with CommandARM control; and transmission-to-engine controller communication. Other new features of the tractors include higher power levels, 280 to 450 horsepower (209 to 336 kilowatt), two new models within the power range (now 5-wheel models and 3-track models), an active seat suspension, improved selective control valves and controls, a new John Deere Field Vision™ Lighting Option offering High-Intensity Discharge (HID) Xenon field lights with more than 350 feet (107 meters) of forward lighting, a larger entry/exit platform and a GreenStar® harness for precision farming.

John Deere Production Engineering Center
Waterloo, Iowa, USA; 319-292-8368

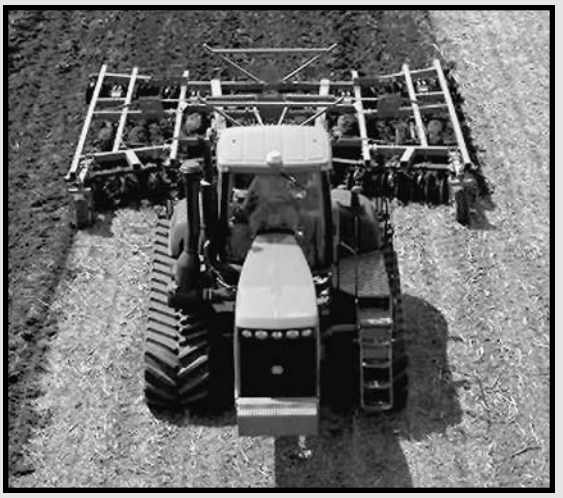
AE50 OUTSTANDING INNOVATIONS 2002

Large-capacity, six-row machine picks cotton from both sides

The Case IH CPX610 Cotton Express® Cotton Picker is a full-capacity, six-row machine using a proprietary technology that picks from both sides of the plant. With a basket capacity of 10,500 pounds (4,765 kilograms), the CPX610 will harvest longer, minimizing unloading frequency. The 340-horsepower (254 kilowatt) electronic engine, full-time all-wheel drive and tire flotation all help to expedite the harvest. This machine has minimized daily service requirements with a maintenance-free rotary air screen and can eliminate daily grease points with the optional auto-lube system. Customer profitability improves by increasing management options through full capacities and picking more cotton.

Case IH
Moline, Illinois, USA; 309-752-3279

Steering system tracks without need for local reference stations



GreenStar® AutoTrac is a DGPS-based assisted steering system offered for John Deere agricultural equipment. AutoTrac is a fully integrated, automatic steering system designed and developed by a full-line agriculture machinery manufacturer. AutoTrac is a member of the GreenStar® Guidance family, built on the easy-to-use GreenStar Parallel Tracking technology. AutoTrac consists of the same GreenStar common components that are used with Combine Yield Mapping and Monitoring, Field Doc, SprayStar, AccuDepth, SeedStar and Map Based Seeding. The operator can activate the system by pressing a single button on the tractor CommandARM® and then regain control by turning the steering wheel. AutoTrac uses the John Deere StarFire™ position receiver and StarFire dual-frequency satellite differential corrections rather than a local reference station for guidance information. This results in less setup and maintenance requirements and lowers initial cost.

John Deere Ag Management Solutions
Urbandale, Iowa, USA; 515-331-4750

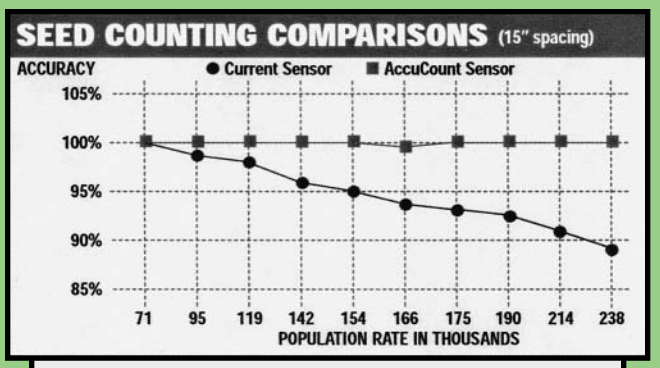
AE50 OUTSTANDING INNOVATIONS 2002

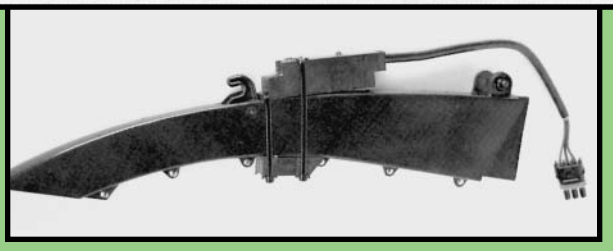
Moisture probe quickly measures, records in the field

Spectrum Technologies, Inc. has developed a portable soil moisture probe that features a modified off-the-shelf TDR-type sensor mounted on a 3-foot (.9-meter) T-handle shaft. Available 4.8- or 8-inch (12- or 20-centimeter) probe rods suit the measurement depth desired. The LCD display provides two modes of operation: volumetric water content or irrigation mode where the relative water content and the irrigation deficit is displayed. A GPS/DGPS-compatible data logger is integrated into the meter's electronics. Software is included with the Field Scout™ TDR 300 Soil Moisture Probe to download data onto a PC for analysis.

Spectrum Technologies, Inc.
Plainfield, Illinois, USA; 815-436-4440

Sensor counts more seeds at higher speeds





AccuCount Planter Seed Counting Sensor offers accurate population counts for soybean growers at increased seed populations and planting speeds. The new sensor is compatible with existing planter monitors. This allows customers to obtain a new level of performance by only purchasing the sensor. Previously existing seed-counting sensors can under-count soybean population rates at average population rates and average planting speeds. Performance of these sensors would degrade as planting speeds increased. The AccuCount sensor is able to count accurately at populations three times the current average populations. The sensor achieves this by integrating a microprocessor to condition the existing signal, allowing the current planter monitors to count using the same signal as prior seed-counting sensors. As seed costs continue to increase, growers can plant close to the desired population to maximize profitability.

John Deere Seeding Group
Moline, Illinois, USA; 309-765-7144 or 309-765-7165

AE50 OUTSTANDING INNOVATIONS 2002

Only one pass preps soil for planting cotton and vegetables

The Case IH 2500 Rip-Bed and DMI ecolo-bed'r 2500 combine to provide deep tillage and bed building that addresses common yield-deteriorating problems in cotton and vegetable production. For many cotton farmers, creating an optimum soil environment requires three separate field passes to manage crop residue, remove soil compaction and create raised beds for planting. With the Case IH 2500 Rip-Bed and DMI ecolo-bed'r 2500, these field operations are accomplished in a single pass using a three-step system of components. First, a straight coulter cuts the prior season's cotton plant's tap root and parts the residue away from the shank. Second, a low-disturbance shank and patented point fractures the compaction layer and improves soil tilth. Third, the loose soil created by the shank is caught and directed over the shank path by a pair of double disc blades. This combination saves time, fuel and labor.

CNH
Goodfield, Illinois, USA; 800-727-4364

Mulcher's use of large, round bales cuts material costs

The Vermeer Top Gun 185 PowerMulcher applies mulch to seeded areas using large, round bales. Operators may reduce material costs by as much as 50 percent (depending on material type) as compared to the small square-bale material. Because this mulcher eliminates the physical work from blowing mulch, labor costs may also be reduced by up to 50 percent compared to the cost of an average crew needed for a small square-bale blower. The controls on the Top Gun 185 Mulcher are located at the operator's station. A single joystick controls the spout movement from side to side (300-degree rotation) as well as up and down. The joystick control is also equipped with electric over-hydraulic switches, which control the rotation of the bale, the depth of cut (feed rate) and the deflector on the end of the spout. These features give the operator greater control of mulch placement.

Vermeer Manufacturing Co.
Pella, Iowa, USA; 641-628-3141

AE50 OUTSTANDING INNOVATIONS 2002

Minimum till ripper maximizes fight against compaction

The John Deere 2100 Minimum Till Ripper is a compaction-fighting tool for no-till and minimum-till producers. It will work at depths up to 16 inches (41 centimeters) while maintaining a relatively smooth soil surface and high-crop residue levels. It is available in five and seven standard sizes with 24-, 30- and 36-inch (61-, 76- and 91-centimeter) spacings. Both ¾- and 1¼-inch (2- and 4-centimeter) -thick shanks are available and shear bolt protected. A variety of ripper points will suit different soil-fracture and residue-level requirements. Most notable is the 7-inch (18-centimeter) Min-till point, which maximizes soil fracture while minimizing residue disturbance on the soil surface. The 2100 comes equipped with 22-inch (56-centimeter) smooth or rippled coulter blades. When equipped with the smooth blade, ¾-inch (2-centimeter) shank, 7-inch (18-centimeter) Min-till point, and optional closing wheels, the 2100 provides a system of components that work together to promote deep ripping in conservation tillage applications.

John Deere Des Moines Works
Des Moines, Iowa, USA; 515-289-3568

Low sidewall tires solve problem of power-hop, road-lope

Titan International's LSW49H tires were developed to solve the problems of power-hop and road-lope aggravated by more powerful, high-speed tractors. These tires offer radial construction for reduced rolling resistance, improved fuel efficiency and increased footprint. A heavier sidewall and special rim give improved puncture resistance and limited run-flat capability keeping the farmer in the fields longer for increased productivity. Most importantly, the LSW (low side-wall) design improves vertical and lateral stability, has increased bead contact area for reduced rim slip and greatly diminishes the tendency of tractor power-hop or road-lope. These tires have a .60 aspect ratio compared to the standard tire's .80 aspect ratio.

Titan International
Akron, Ohio, USA; 330-798-7555

AE50 OUTSTANDING INNOVATIONS 2002

Automated, high-capacity baler handles range of forage crops

The New Holland Model BB950 Big Baler makes tight, dense bales of forage crops ranging from dry hay and straw to high-moisture silage. The BB950 produces bale dimensions of 47 x 28 inches (120 x 70 centimeters) and up to 98 inches (250 centimeters) in length. The bales are easy to handle, transport and store. The baler features the exclusive InfoView™ baler-control system, which automatically controls bale density while monitoring a multitude of functions and providing auto-diagnostics for the balers. The optional CropCutter™ crop-cutting system chops the crop into shorter lengths for denser bales and easier use for feed and bedding. A suspended tandem axle is available for a better ride on the road and in the field, increasing comfort and daily capacity. Another exclusive feature is the enclosed gearbox driveline to the stuffer and knotters, replacing the higher-maintenance open gear or chain drives of conventional big balers.

CNH
New Holland, Pennsylvania, USA; 717-355-3663

Field cultivator prepares seed bed with precision

The 2200 Field Cultivator from John Deere is designed for precise and accurate seedbed tillage. Precise depth control in seedbed preparation conserves moisture, incorporates chemicals and creates a quality soil structure for planting and seeding. The AccuDepth control system handles adjustments on the move and increases productivity. The floating hitch, the frame strength of the tube-through-tube design and wheel-package placement allow the 2200 to offer consistent front-to-back and side-to-side sweep depth. AccuDepth control uses individual wheel sensors and electronic circuitry to level the frame and to maintain depth measurements. The field cultivator prepares a seedbed by mixing soil, leveling and maintaining depth control in 1/10-inch (0.254-centimeter) increments. Managing the soil with this field cultivator promotes seed-to-soil contact for early root development, ultimately increasing yields for producers.

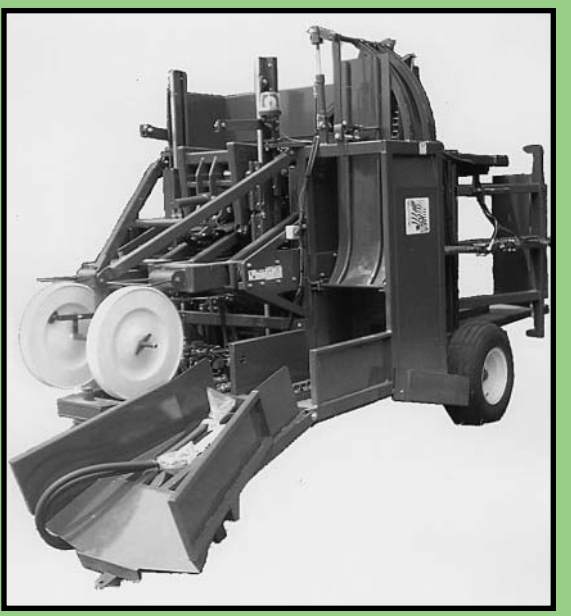
John Deere Des Moines Works
Des Moines, Iowa, USA; 515-289-3163 or 515-289-3346

AE50 OUTSTANDING INNOVATIONS 2002

Bale banding can help consumers save a bundle

The Bale Band-It from Landoll/GFC eliminates the manual labor involved in producing small square bales of hay. The Bale Band-It is pulled behind a baler, banding together 21 small bales into a tight, self-supporting bundle. This fully automatic machine packages together the bales, using only two ½-inch (1.3-centimeter) wide straps around the length of the bundle. The 21-bale bundle can be moved with simple pallet forks mounted on a tractor or forklift. Current small-bale handling equipment adds some labor savings to hay producers, but provides no labor savings for the end consumer. With the bundle, the end consumer needs nothing more than a forklift to have the same mechanical handling advantage as the producer. Manual labor is eliminated from the field, storage, transportation and end consumer. These labor savings from the bundles make the hay more marketable and create a value-added product.

Landoll/GFC
Pittsfield, Illinois, USA; 217-285-6487



Weather monitoring comes in compact box

The WatchDog™ family of weather stations was developed by Spectrum Technologies as a versatile and affordable compact system designed for remote monitoring. Four AA batteries power the station for eight months eliminating the cost of a solar power package. Each station has its own built-in data logger with non-volatile memory and clock for date and time. The product offering includes five models, which feature four external channels (three on model 900ET) that can be connected to sensors that measure soil moisture, soil temperature, leaf wetness, solar radiation and so forth. The station ships assembled in a 12-inch (30-centimeter) cube box and requires SpecWare 6.0 software to function.

Spectrum Technologies, Inc.
Plainfield, Illinois, USA; 815-436-4440

AE50 OUTSTANDING INNOVATIONS 2002

Compact transport planter negotiates narrow spaces

The 1760NT (Narrow Transport) Planter from John Deere is designed for narrow transport and quick-fold convenience. Offered as a 6 or 8 row with 30-inch (76-centimeter) spacing, both sizes are designed with wings that fold to the front 180 degrees. The wings can be folded manually, which reduces the complexity and cost of the machine. The 8 row can be ordered with optional hydraulic-fold cylinders. This frame configuration provides a transport width of 12 feet (3.7 meters), allowing the machine to stay within the width of a tractor equipped with dual rear wheels. The 8 row configuration also comes with a new bi-fold marker that has a float range of 30 inches (76 centimeters) up and down. A break-away feature protects the markers in the event that an obstacle is hit with the marker arm. The 6-row configuration uses an existing single-fold marker arm. The machines plant in all field conditions such as conventional till, mulch till and true no till. They are equipped with MaxEmerge® Plus row units, which provide high strength, depth control and seed spacing. A new mounting bracket which allows the use of John Deere frame-mounted fertilizer openers is also available.

John Deere Seeding Group
Moline, Illinois, USA; 309-765-7314

Raised cab offers flat floor, greater visibility

John Deere 5000 TWENTY Series utility tractors feature a completely new cab and Isolated Open Operator Station (IOOS). The new cab and IOOS have flat floors, providing more room than the more traditional straddle-mount design of the TEN series and competitive models. Both platforms are isolated from the chassis using rubber isolators. The controls are cable operated and ergonomically placed for added comfort and reduced vibration. The floor of the new cab is raised approximately 7 inches (18 centimeters) over previous models to obtain the flat-floor design. In spite of this, the new cab offers improved loader visibility with its patented raised header bar design. In addition, the overall height of the cab did not increase. The raised header bar allows the operator to easily see the bottom of the loader bucket in the full-raise position without leaning over the steering wheel.

John Deere Product Engineering Center
Waterloo, Iowa, USA; 319-292-6100

AE50 OUTSTANDING INNOVATIONS 2002

Compact, maneuverable sugar cane harvester designed for small fields with narrow rows

The AHX1800 Sugar Cane Harvester is specifically designed for harvesting sugar cane cultivated in narrow rows. With its smaller size and lower price than other commercially available chopper harvesters, the AHX1800 increases customer profitability by lowering the break-even sugar cane tonnage. Worldwide, a majority of sugar cane is cut by hand. Many fields are too small to be harvested economically and effectively by existing sugar cane harvesters. The AHX1800 is designed for these small fields, narrow-row spacings and smaller yields. It includes advanced hydraulics, a low center of gravity and lighting for nighttime harvesting.

CNH
Moline, Illinois, USA; 309-752-3279

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