CONFERENCE PROGRAM

5TH INTERNATIONAL CONFERENCE ON PRECISION AGRICULTURE

AND OTHER RESOURCE MANAGEMENT

TO HIGHLIGHT THE LATEST SIGNIFICANT RESEARCH AND ITS APPLICATION IN PRECISION AGRICULTURE

July 16-19, 2000

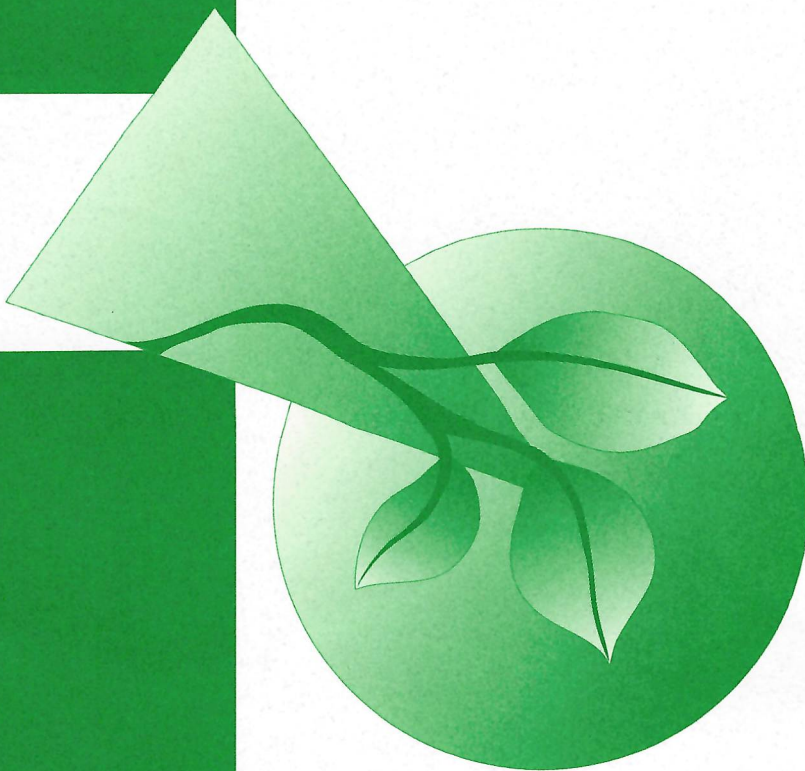**Radisson Hotel South and Plaza Tower
Bloomington, Minnesota USA**

ORGANIZED BY:

The Precision Agriculture Center, UM

Department of Soil, Water, and Climate, University of Minnesota

The University of Minnesota Extension Service

College of Agricultural, Food, and Environmental Sciences

University of Minnesota

CONFERENCE THEMES

Natural Resource Variability

Managing Variability

Information Management

Precision Management

Profitability

Environment

Education/Outreach

Technology Transfer

Modeling

New Applications Around the World

Remote Sensing

Engineering Technology

Management Zones

Geostatistics/Sampling

*Crop Quality*

Integrated Approach

A to Z for Practitioners

5TH INTERNATIONAL CONFERENCE ON

PRECISION AGRICULTURE

AND OTHER PRECISION RESOURCES MANAGEMENT

July 16-19, 2000

PURPOSE

This conference will highlight significant research and its application in precision agriculture conducted largely in the two years since our last conference. It will offer oral and poster presentations and exhibits, an opportunity for discussion and exchange of information in various aspects of precision agriculture. Tuesday morning workgroup sessions will discuss decision support tool needs and suggest changes for the next conference. The precision A to Z track will offer extended sessions on key topics for producers and agri-businesses.
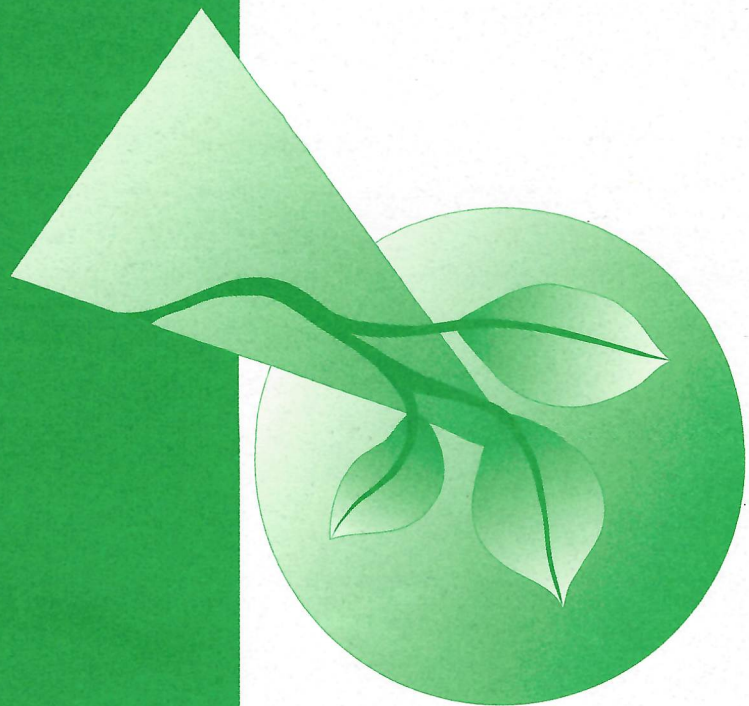
ORGANIZED BY:

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SPONSORS

Potash Phosphate Institute (PPI)

Consortium for Site Specific Resource Management (CoSSRM)

The Tri-Societies (ASA/CSSA/SSSA)

Certified Crop Adviser (CCA) credits have been applied for. Check at the registration desk for current information

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RADISSON HOTEL MEETING ROOM MAP

GARDEN COURT, FIRST FLOOR

GARDEN COURT

FIRST FLOOR PLAZA ROOMS

PLAZA 3 | PLAZA 2 | PLAZA 1

PLAZA MALL

PLAZA 4

PLAZA 5 | PLAZA 6

FREIGHT ELEVATOR

VISTA CONFERENCE CENTER, 22ND FLOOR

VISTA 2202

VISTA 2204

VISTA 2206

VISTA 2208

VISTA LOUNGE 2201

VISTA 2203

VISTA 2205

VISTA 2207

LADIES ROOM

MENS ROOM

8 | 7

6 | 5

VERANDA BALLROOM

4 | 3

2 | 1

CORRIDOR

EAST-B

EAST-A

GRAND BALLROOM

CENTER | WEST

NORMANDALE ROOM

GRAND BALLROOM FOYER

COAT CHECK

LADIES ROOM | MENS ROOM

FOYER

BLOOMINGTON ROOM

EDINA ROOM

FOYER

BUSINESS CENTER/ BANQUET OFFICE

MENS ROOM

SECOND FLOOR MEETING ROOMS

ATRIUM 4 | ATRIUM 3 | ATRIUM 2 | ATRIUM 1

FOYER

LADIES ROOM

SALES & CATERING OFFICE | ATRIUM 5 | ATRIUM 6 | ATRIUM 7 | ATRIUM 8

NOTE: Your name badge is your ticket for Conference sessions and meals. Please wear it at all times while attending Conference events.

SUNDAY, JULY 16

8:45-9:00	**Meet for field trips at north entrance by Plaza Java Coffee Shop**
9:00-12:00	**First Research Workshop:** Cokriging and Geostatistics, Plaza 1
11:00-6:00	**Registration,** Grand Ballroom Foyer

Afternoon

1:00-5:00	**Industry Updates:**
	■ Hardware, Atrium 4
	■ Software, Atrium 7
1:00-5:00	**Research Session:** Applications of Remote Sensing to Precision Agriculture, Bloomington Room
1:00-5:00	**Software Boutique,** Atrium 6
1:00-4:00	**Second Research Workshop:** Cokriging and Geostatistics, Plaza 1
4:00-5:00	ESRI demonstration of the Geostatistical Analyst, Plaza 1
3:00-3:20	**Break,** near exhibits and posters
5:00-7:00	**Exhibit Opening,** Grand Ballroom East A&B
5:00-7:00	**Reception and Cash Bar,** Veranda Ballroom

MONDAY, JULY 17

Morning

7:00-7:45	**Continental Breakfast Buffet,** Garden Court
7:00-5:00	**Registration continues,** Grand Ballroom Foyer
8:00-8:15	**Opening Remarks:** Dr. Pierre Robert, Chair, Grand Ballroom Center and West
8:15-8:30	**Welcome:** Dean Muscoplat, COAFES, UM Grand Ballroom Center and West
8:30-10:00	**General Session:**
	■ Precision Agriculture Trends and Development in Europe: A View from the Second European Conference, Dr. John Stafford, Silsoe Solutions, Grand Ballroom Center and West
	■ Electronic Connectivity and Precision Agricultural Management: Some Thoughts About What the Future Will Be, Dr. Norman Chervany, Carlson School of Management, University of Minnesota, Grand Ballroom Center and West
10:00-10:20	**Break,** near exhibits and posters
10:20-12:00	**Concurrent Sessions:**
	■ Managing Variability, Bloomington Room
	■ Engineering Technology, Grand Ballroom West
	■ Geostatistics/Sampling, Edina Room
	■ Remote Sensing/Nitrogen Management/Pest Management, Grand Ballroom Center
	■ A to Z for Practitioners, Atrium 6
10:00-6:00	**Exhibits,** Grand Ballroom East A&B
12:00	**Lunch,** Garden Court

Afternoon

1:00-3:20	**Concurrent Sessions:**
	■ Managing Variability, Bloomington Room
	■ Engineering Technology, Grand Ballroom West
	■ Geostatistics/Sampling, Edina Room

- Remote Sensing/Nitrogen Management/Pest Management, Grand Ballroom Center
- A to Z for Practitioners, Atrium 6

2:20-2:40	**Break for Research Sessions,** near exhibits and posters
2:40-3:00	**Break for A to Z Session,** location near meeting room
3:40-6:00	**Poster Session:** authors present, Veranda Ballroom
5:00-6:00	**Cash Bar,** near exhibits and posters

TUESDAY, JULY 18TH

Morning

7:00-7:45	**Continental Breakfast Buffet,** Garden Court
7:00-5:00	**Registration Continues,** Grand Ballroom Foyer
8:00-6:00	**Exhibits,** Grand Ballroom East A&B
8:00-6:00	**Posters on Display,** Veranda Ballroom
8:00-10:40	**Concurrent Sessions:**

- New Applications around the World, Bloomington Room
- Natural Resources Variability, Grand Ballroom West
- Modeling, Edina Room
- Management Zones, Grand Ballroom Center
- A to Z for Practitioners, Atrium 6

9:20-9:40	**Break,** near exhibits and posters
10:40-12:00	**Workgroups** (see your numbered name badge for room assignment); information on p.16
12:00	**Lunch,** Garden Court

Afternoon

| 1:00-4:20 | **Concurrent Sessions:** |

- New Applications around the World/Environment, Bloomington Room
- Yield Variability/Integrated Projects, Grand Ballroom West

- Information Management, Grand Ballroom Center
- Profitability, Edina Room
- A to Z for Practitioners, Atrium 6

2:40-3:00	**Break,** near exhibits and posters
5:00-6:00	**Cash Bar,** near exhibits and posters
6:30	**Banquet,** Garden Court

WEDNESDAY, JULY 19TH

Morning

7:00-7:45	**Continental Breakfast Buffet,** Garden Court
7:00-10:00	**Registration Continues,** Grand Ballroom Foyer
8:00-10:00	**Concurrent Sessions:**

- Technology Transfer, Bloomington Room
- Integrated Approaches for a Practical Precision Agriculture, Grand Ballroom Center
- Management for Crop Qualities, Grand Ballroom West
- A to Z for Practitioners, Atrium 6

10:20-10:40	**Break,** near exhibits and posters
10:45-11:45	**General Session:** Precision Agriculture, Biotechnology and E-Business: Sharing Data for Better Solutions, Dr. John Ahlrichs, Rooster.com, Grand Ballroom Center and West
11:45-12:00	**Closing Remarks,** Grand Ballroom Center and West

NOTE: Presenter Ready Room and E-mail access in Normandale Room.

BLOOMINGTON ROOM

Applications of Remote Sensing to Precision Agriculture

Chair: G. Nielsen, *Montana State University*

01:00	Spectral Resolution and Georectification Issues Applied to Soybean Production *Ronald T. Schuler, C. Ficenic, J. D. Gage, and M. Dudka*
01:20	Measuring Soil BRDF with a Field Goniometer *Roger L. King and M. Cox*
01:40	Coincident Detection of Crop Water Stress, Nitrogen Status and Canopy Density Using Ground-Based Multispectral Data *Edward M. Barnes, T. Clarke, P. Colaizzi, J. Haberland, M. Kostrzewski, E. Riley, S. Moran, P. Waller, C. Choi, T. Thompson, S. Richards, R. Lascano, and H. Li*
02:00	In Situ Detection of Leaf Chlorophyll Content and Leaf Nitrogen Content in Zea Mays L. Using Remote Sensing *Marshall K. Beatty and C.J. Johannsen*
02:20	Results of a Seeding Rate Experiment and an NDVI-to-Yield Correlation Study *Richard Campanella and K. B. Hood*
02:40	Matching Multi Temporal Yield and Images Data *Laurent Layrol, E. Hedoin, and D. Lepoutre*
03:00	**BREAK**
03:20	Relative Potential Crop Growth Assessment from Remotely Sensed Images Compared to Three Yield Maps *Anna Rydberg and M. Söderstöm*
03:40	Use of Remote Sensing Technology for Improved Crop Scouting *Greg K. Blumhoff and C. Johannsen*
04:00	Clutterless Imagery and Its Use in Precision Farming *Richard D. Curley and S. Paley*
04:20	Autoregressive Analysis of Cotton Lint Yield: Plant Spectral Characteristics and Field Variability *Hong Li, R. J. Lascano, E. M. Barnes, J. Booker, T. Wilson, and K. Bronson*
04:40	**DISCUSSION**

ATRIUM 4

Industry Updates

Moderator: Bob Wanzel, *Doane Publishing*

Short presentations from companies with new product or service announcements.

1:00	IMAGIS, A Web-based Satellite Imagery GIS Delivery System-Lanny Faleide, Agri ImaGIS
1:25	GPS/Swathing Guide, Chemical Injection, and Data Logging-Dan Rykhus, Raven Industries, Inc.
1:50	Integration of Sensor Hardware with Grower Solutions, Grower Decisions-John Mascoe, ADCOM Telemetry
2:15	Field Guidance Systems, GPS Receivers, and Field Information Systems—Sid Siefken, Trimble Navigation Ltd.
2:40	Swath Lightbar Guidance, Electronic Rate Controllers for Liquid and Dry Products, and Field Management Software—Corey Colliver, Midwest Technologies
3:05	**BREAK**
3:20	StarFire™, GPS Receiver, A New Dual Frequency GPS Receiver — Wayne Smith, John Deere
3:45	New Technology in Weather Stations; Soil Compaction and Moisture, Measuring Chlorophyll Reflectance-Mike Thurow, Spectrum Technologies
4:10	Field Data Collection Using ArcPad; ArcIMS; and Model Builder-Max Crandall, ESRI

PLAZA 1

Cokriging and Geostatistics Workshop,
Session I,
Dr. D.J. Mulla, 9:00-12:00

Cokriging and Geostatistics Workshop,
Session II,
Dr. D.J. Mulla, 1:00-4:00

ESRI's Geostatistical Analyst Presentation
by Dr. Konstantin Krivoruchko, ESRI, 4:00-5:00

ATRIUM 7

Industry Updates

Moderator: Grant Mangold, *@gINNOVATOR*

Short presentations from companies with new product or service announcements.

1:00	New Developments in GPS and DGPS,- John Pointon, Omnistar
1:25	Perfecting Automated Soil Sampling and Compaction Mapping—Darryl Justesen, Concord Environmental Equipment
1:50	Agricultural Remote Sensing by Way of the Internet- Chuck Nichols, EarthScan Network
2:15	The Business of SOILTEQ - Mission, Product Offerings, Product Positioning, Market Position and Future Direction—John Mann, SOILTEQ
2:40	Update on VantagePoint Programs—Tom Krill, VantagePoint Network
3:05	Break
3:20	FieldBook Software for Recording Farm Management Operations that Affect Yield—Matt Waits, SST Development Group
3:45	AGIS, A Farm GIS System-Ren Clark, Delta Data System, Inc.
4:10	To be announced

ATRIUM 6

Software Boutique

Moderator: Stuart Pocknee, *University of Georgia*

1:00	**Farm Works Software,** agBOSS
1:30	**SST Development Group,** SSToolbox
2:00	**Red Hen Software,** MapCalc and General Overview of Products
2:30	**John Deere,** JDmap 4.0 Deluxe
3:00	**Ag Leader,** SMS Basic
3:30	**SOILTEQ,** SGIS 3.0
4:00	**Trimble Navigation, Ltd.,** AgGPS 170
4:30	**AGRIS Corporation,** Crop Planning and Record Keeping
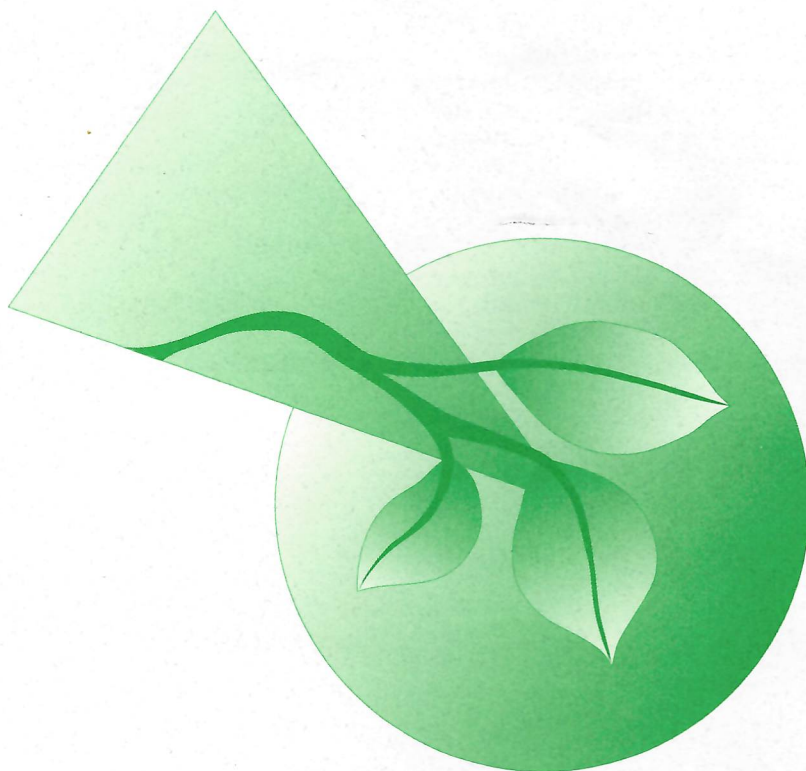
BLOOMINGTON ROOM

Managing Variability

Chair: D. W. Franzen, *North Dakota State University*

10:20 Relationships Between Soil Fertility Indicators and Corn/Soybean Yield
Guy Forand, M. C. Nolin, A. Karam, S. Lavoie, R. R. Simard, and A. N. Cambouris

10:40 Spatial Variability of Corn Yield Affected by Landscape Position, Nitrogen, Phosphorus, and Soil Mechanical Impedance
Jeff S. Strock, G. L. Malzer, and P. Porter

11:00 Spatially Probabilistic Evaluation of the Benefit of Starter Fertilizer to No-Till Corn
John Grove, E. M. Pena-Yewtukhiw, and J. A. Thompson

11:20 Feasibility of Variable Rate Management of Corn Hybrids and Seeding Rates
John Shanahan, T. Doerge, C. Snyder, A. Luchiari, and J. Johnson

11:40 Spatial Response of Corn Grain Yield to Swine Manure on a Southwestern Minnesota Soil
Daniel Schmitz and G. L. Malzer

Chair: T. Peterson, *Pioneer Hi-Bred International, Inc.*

01:00 Site-Specific Nitrogen and Irrigation Management Across Nebraska Agro-Ecological Zones
C. A. Shapiro, J. M. Blumenthal, B. L. Benham, Richard B. Ferguson, G. W. Hergert, W. L. Kranz, W. B. Stevens, W. Waltman, and C. D. Yonts

01:20 Practical Implications from Variable Nitrogen Studies in Irrigated Corn
John P. Schmidt, R. K. Taylor, A. J. Dejoia, and R. K. Young

01:40 Development and Validation of a Variable Rate Nitrogen Program in Central Illinois
Robert H. Hornbaker, R. M. Rejesus, and G. D. Schnitkey

02:00 Corn Yield Response to N Fertilizer for a Range of Water Regimes and Soil Mapping Units
Carl R. Camp, E. J. Sadler, D. E. Evans, and J. A. Millen

02:20 **BREAK**

02:40 Spatial Precipitation Variability in the Choice of Nitrogen Fertilization Rates
Monte O'Neal, J. Frankenberger, and D. Ess

03:00 Soybean Grain Yield Response to Phosphate Application Across a Glacial Till Landscape
George W. Rehm and J. A. Lamb

03:20 Effects of Located Application of Papermill Residues on Crop Yields and Soil Quality
Athyna N. Cambouris, M. C. Nolin, and R. R. Simard

GRAND BALLROOM WEST

Engineering Technology

Chair: S. W. Searcy, *Texas A & M University*

10:20 Use of A New Sub-Metric Multi-Depth Soil Imaging System (MuCEp c)
M. Dabas, D. Boisgontier, J. Tabbagh, and A. Brisard

10:40 Soil Characterization Using a Near-Infrared Penetrometer
Irfan S. Ahmad, J. W. Hummel, and K. A. Sudduth

11:00 Using an Automated Penetrometer and Soil EC Probe to Characterize the Rooting Zone
Paul E. Drummond, C. D. Christy, and E. D. Lund

11:20 Soil Electrical Conductivity Variability
Nathaniel Hartsock, T. G. Mueller, S. A. Shearer, G. W. Thomas, and R. I. Barnhisel

11:40 On-line Real-time Soil Spectrophotometer
S. Shibusawa, S. Hirako, K. Yamazaki, and A. Otomo

Chair: J. Hummel, *USDA-ARS-MWA*

01:00 An Ultra-Precise, GPS Based Planter for Site-Specific Cultivation and Plant-Specific Chemical Application
M. R. Ehsani, M. Mattson, and S. K. Upadhyaya

01:20 Real Time Assessment of Cotton Plant Height
Stephen W. Searcy and A. D. Beck

01:40 Cotton-Harvester-Flow Simulator for Yield Monitor Development
R. Sui, J. A. Thomasson, and S. D. To

02:00 Evaluation of Yield Sensing Systems for Potato Harvesters
Per-Anders Algerbo and D. Ehlert

02:20 **BREAK**

02:40 Yield Data Enhancement by Using Signal Analysis Methods
P. Chery and G. Grenier

03:00 Optimization of Sprayer Performance
Andrey V. Skotnikov and M. Gofron

03:20 A Method for Testing the Effectiveness of Fertilizer Spreaders for Precision Agriculture
Jonathan Chaplin, J. Kaplan, T. Hustrulid, and B. Hetchler

EDINA ROOM

Geostatistics/Sampling

Chair: D. Mulla, *University of Minnesota*

10:20 Identifying Cost-Effective Soil Sampling Schemes For Variable-Rate Fertilization and Liming
Antonio P. Mallarino and D. J. Wittry

10:40 Grid Cell Size Needed For Sugar Beet Nitrogen Recommendations in Southern Minnesota: Nutrient Maps and Root Yields
John A. Lamb, M. Bredehoeft, and G. W. Rehm

11:00 Accuracy of Soil Fertility Maps: Several Case Studies in Kentucky
Thomas G. Mueller, K. L. Wells, S. A. Shearer, D. S. Adams, and A. Kumar

11:20 Field Heterogeneity on Water and N Use in Cotton: State-Space Analysis
Hong Li, R. J. Lascano, J. Booker, T. Wilson, and K. Bronson

11:40 Evaluation of Remote Sensing and Targeted Soil Sampling for Variable Rate Application of Lime
David J. Mulla, A. C. Sekely, and M. Beatty

Chair: F. Pierce, *Michigan State University*

01:00 Assessment of Scale Dependence of Spatial Variability of pH and Organic Carbon in a Clay Soil
Sidney R. Vieira

01:20 Optimization of Site-Specific Fertilization Recommendations: Geostatistical Assessment of Local Uncertainty in Mapping Phosphorus and Potassium Attributes
Eric Hedoin, R. H. Hornbaker, and T. R. Ellsworth

01:40 Comparison of Different Statistical Techniques in the Analysis of On-Farm Experiment
Matthew L. Adams, and S. E. Cook

02:00 Nonparametric Geostatistics/Probabilistic Sourcing of Nitrate to a Contaminated Well
E.M. Pena-Yewtukhiw, J. Grove, and E. G. Beck

02:20 **DISCUSSION**

GRAND BALLROOM CENTER

Remote Sensing/Nitrogen Management

Chair: D. Lepoutre, *GEOSYS*

10:20 Calibration of Remotely Sensed Corn Color to Predict Nitrogen Need
Peter Scharf and J. A. Lory

10:40 Characterization of Nitrogen Stress Using Aerial Photos
Larry L. Hendrickson and S. Han

11:00 In-Season N Fertilization Using INSEY
J. B. Solie, W. R. Raun, M. L. Stone, G. V. Johnson, E. V. Lukina, W. E. Thomason, D.E. Needham, J. Wang, and C. Washmon

11:20 Soil Clay Estimation With ATLAS Sensor Data
Feng Chen, D.E. Kissel, D. Rickman, L.T. West, J. Luvall, C. Kvien, and W. Adkins

11:40 Relationships Between Yield Monitor Data and Airborne Multispectral Digital Imagery
Chenghai Yang and J. H. Everitt

Remote Sensing/Pest Detection and Management

Chair: C. Kvien, NESPAL, *University of Georgia*

01:00 Multi-Frequency Optical Identification of Different Weeds and Crops for Herbicide Reduction in Precision Agriculture
Rainer H. Biller and Dr.-Ing Rolf Schicke

01:20 Weed Detection in Soybeans using Hyperspectral and Multispectral Imagery
Benjamin L. Varner, T. A. Gress, and K. Copenhaver

01:40 Incorporating Weed Ecology, Severity Indices and Remote Sensing to Delineate Weed Management Zones
Chuck Cole, S. Clay, K. Dalsted, D. Clay, and P. Thanapura

02:00 Using Infrared Transducers to Sense Greenbug Infestation in Winter Wheat
G. J. Michels, G. Piccinni, C. M. Rush, and D. A. Fritts

02:20 **BREAK**

02:40 Remote Sensing of Insect Damage in Wheat
Walter E. Riedell, L. S. Hesler, S. T. Osborne, and T. M. Blackmer

03:00 Spectral Changes in Picked Cotton Leaves with Time
J. A. Thomasson, D. C. Akins, and R. Sui

03:20 **DISCUSSION**

BLOOMINGTON ROOM

New Applications around the World
Chair: J. Bouma, *Wageningen Agricultural University, The Netherlands*

08:00   **KEYNOTE:** Precision Agriculture: A World Perspective
Dean Fairchild, Cargill

08:40   Site Specific Nutrient Management (SSNM) to Improve Production Efficiency in Chile
Rodrigo A. Ortega, and L. A. Flores

09:00   Sampling for Site-Specific Farming in Brazil: Evaluation of Soil Fertility Parameters
Carlos A. Silva, A. C. C. Bernardi, P. L. O. de A. Machado, A. Granato de Andrade, and C. A.F.S. do Carmo

09:20   **BREAK**

09:40   Variability in Spring Wheat Yields Under No-Tillage in Southern Brazil
Glaucio Roloff, D. Focht, P. S. Marthaus, P. H. Cervi, M. A. D. Fernandes, and R. A. Rodrigues

10:00   The Potential for Precision Agriculture for Soil and Sugarcane Yield Variability in Brazil
Jose E Cora and J. Marques Jr.

10:20   Nitrogen Management in Corn Using Site Specific Crop Response Estimates
Rodolfo Bongiovanni and J. Lowenberg DeBoer

Chair: N. McLaughlin, *Agriculture and Agri-Food Canada*

01:00   Development of a Methodology for the Variable-Rate Application of Fertilizer in Irrigated Cotton Fields
Craig Stewart and A. McBratney

01:20   A Novel Approach for Managing Plant Nutrients and Its Application in Rice
Achim Dobermann and C. Witt

01:40   Yield Variability Analysis in Two Four-Crop-Rotation Fields (1996-1999) in the Sacramento Valley, California
J. F. Perez, G. S. Pettygrove, Richard E. Plant, J. A. Young, R. O. Miller, S. K. Upadhyaya, L. F. Jackson, and R. F. Denison

02:00   Spatial Variability of Yield and Chlorophyll Content in a Korean Rice Paddy Field
Sun-Ok Chung, J. Sung, K. A. Sudduth, and S. T.Drummond

02:20   Effect of Shade (Grevillea robusta) on Micro-Climate and Soil Fertility in Tea Plantations at High Altitude
A. Anandacoomaraswamy and E.P.S.K. Ediriweera

02:40   **BREAK**

Environment
Chair: N. McLaughlin, *Agriculture and Agri-Food Canada*

03:00   Strategies for Site Specific Fertilization in a Highly Productive Agricultural Region
Hans W. Griepentrog

03:20   Comparison of Soil Spatial Variability in Crop and Rangeland
Yuxin Miao, Clay Robinson, S. R. Evett, and B.A. Stewart

03:40   Characterization of Spatial Variability of Soil Properties in a Watershed that Affect Herbicide Behavior
Carrie D. Graff, W. C. Koskinen, J. Anderson, T. R. Halbach, and R. H. Dowdy

04:00   A Precision Landscape Planning Approach for Controlling Agricultural Nonpoint Source Pollution
Zeyuan Qiu and Tony Prato

04:20   Differences in Nitrate Leaching under Variable and Conventional Nitrogen Fertilizer Management in Irrigated Potato Systems
Kelly M. Whitley, J. R. Davenport, and S. R. Manley

04:40   **DISCUSSION**

GRAND BALLROOM WEST

Natural Resources Variability
Chair: D. Clay, *South Dakota State University*

08:00   Effects of Soil Variability on pH in Coastal Plain Soils
David E. Kissel, A. Weaver, F. Chen, and W. Adkins

08:20   Variability in Soil Factors in Michigan Commercial Alfalfa Fields
Richard Leep, M. McNabnay, D. Warncke, R. Brook, and T. Dietz

08:40   Spatial Variability of C-13 Isotopic Discrimination in Corn (Zea mays)
David E. Clay, S.A. Clay, Z. Liu, C. Reese, and C. Chang

09:00   Mapping Soil Hardpans with the Penetrometer and Electrical Conductivity
Rex L. Clark, D. Kissel, F. Chen, and W. Adkins

09:20   **BREAK**

09:40   Within-field Variations in Plant-Available Soil Nitrogen - Possibilities to Predict and Relevance for Optimal Nitrogen Fertilization
Sofia Delin and B. Linden

10:00   Sensory Measurement of Actual Plant Parameters in Cereals for Site-Specific Fungicide Application
Karl-Heinz Dammer, G. Wartenberg, V. Hammen, D. Ehlert, and C. Schulze

10:20   Spatial Variability of Root Lesion Nematodes in Potato/Corn Rotation Fields
Gaylon D. Morgan, A. E. MacGuidwin, and L. K. Binning

Yield Variability
Chair: R. Ferguson, *University of Nebraska*

01:00   Interrelationships Between Plant Tissue Analysis, Soil Analysis, Soil Conductivity, and Yield
Joe K. Curless and L. K. Binning

01:20   Influence of Claypan-Soil Topsoil Thickness and Fertility Factors on Corn and Soybean Yield
Newell R. Kitchen, K. A. Sudduth, and J. J. Fridgen

01:40   Spatial Variability of Yield and Soil Parameters in Two Irrigated Cotton Fields in Texas
Jian L. Ping and C. J. Green

02:00   Comparing the Spatial Variability of Sudangrass Yield, Topography and Soil Properties
Erik Czinege, T. Nemeth, L. Pasztor, and T. Toth

02:20   Spatial Stability of Yield in Corn, Cotton, and Soybean
Steven H. Moore and M. C. Wolcott

02:40   **BREAK**

03:00   Spatial and Temporal Variability of Corn and Sorghum Yield: Interactions of Biotic and Abiotic Factors
Stephen Machado, E. D. Bynum Jr., T. L. Archer, R. J. Lascano, M. Yu, E. Segarra, K. Bronson, and D. Nesmith

03:20   Yield Certainty with Plots or Fields
Thomas S. Colvin, D. Jaynes, T. Kaspar, D. James, and D. Meek

Integrated Projects
Chair: R. Ferguson, *University of Nebraska*

03:40   Experiences with Site-Specific Farming in a Demonstration Project in the SE Coastal Plain
Edward John Sadler, B. K. Gerwig, J. A. Millen, W. Thomas, and P. Fusse

04:00   An Integrated Approach to Precision Farming Research
Gregg Johnson, G. Rehm, J. Strock, N. Eash, B. Potter, J. Lamb, P. Porter, D. Hicks, and V. Eidman

04:20   Multidisciplinary Study of Irrigated Precision Farming
Dale F. Heermann, J. Hoeting, H. R. Duke, D. G. Westfall, G. W. Buchleiter, P. Westra, F. Peairs, and K. Fleming

04:40   **DISCUSSION**

EDINA ROOM

Modeling

Chair: J. Sadler, *USDA-ARS-Florence*

08:00 Modeling Surface and Subsurface Water Flow in a Spatially Variable Terrain
Bruno Basso, J. C. Gallant, and J. T. Ritchie

08:20 Modelling the Agricultural and Environmental Consequences of Non-Uniform Irrigation on a Maize Crop at Field Scale
Laurent Bruckler, F. Lafolie, S. Ruy, B. Mary, J. Granier, D. Baudequin, and P. Bertuzzi

08:40 Spatial vs. Temporal Management of Nitrogen in Precision Agriculture
Harold M. van Es, J. M. Sogbedji, W. J. Cox, S. D. Klausner and D. R. Bouldin

09:00 Deriving Potential Yield-Maps Through the Use of Crop Growth Models, Site Information and Remote Sensing
A. Werner, S. Doelling, J. Pauly, R. Roth, A. Jarfe, and J. Kuhn

09:20 **BREAK**

09:40 Predicting Corn Grain Yield Spatial Pattern: Comparison of Techniques
Ricardo P. Braga and J. W. Jones

10:00 Parameterizing Weed Interference Models with Site Specific Data
Edward Luschei, L. Van Wychen, B. Maxwell, A. Bussan, D. Buschena, and D. Goodman

10:20 Using Yield and Soil Electrical Conductivity (EC) Maps to Derive Crop Production Performance Information
Eric Lund, C. D. Christy, and P. E. Drummond

Information Management

Chair: J. Grove, *University of Kentucky*

01:00 **KEYNOTE:** Site-Specific Data: Integration, Interpretation and Action
Harold F. Reetz, Jr., PPI

01:40 Creating Yield Maps from Yield Monitor Data Using Multi-Purpose Grid Mapping (MPGM)
Randal K. Taylor, D. L. Kastens, and T. L. Kastens

02:00 Development and Applications of a Field-level Geographic Information System (FIS) for Precision Agriculture
Naiqian Zhang, R. Taylor, M. Schrock, S. Runquist, E. Runquist, G. Kluitenburg, J. Schmidt, and S. Staggenborg

02:20 Routines for Efficient Yield Mapping
Silvia Haneklaus, E. Schnug, E. Haveresch, H. Lilienthal

02:40 **BREAK**

03:00 An Expert Filter Removing Erroneous Yield Data
Thylen Lars and G. Antje

03:20 Use of the Decision Support System for Agriculture (DSS4Ag) for Corn Fertilization in Kentucky
Scott A. Shearer, R. L. Hoskinson, R. K. Fink, T. Mueller, A. Thomasson, J. P. Fulton, and M. Ellis

03:40 Using the Decision Support System for Agriculture (DSS4Ag) for Potato Fertilization
Reed L. Hoskinson, R. K. Fink, J. Richard Hess, R. Oborn, T. Tindall, and L. Robinson

04:00 Development of an Internet-Based Communication and Information Network for Agro-Businesses Using Precision Farming Technologies
Ruth E. Lutticken

04:20 **DISCUSSION**

GRAND BALLROOM CENTER

Management Zones

Chair: T. Colvin, *USDA-ARS-NSTL*

08:00 Management Zones for Soil N and P Levels in the Northern Great Plains
David W. Franzen, A. D. Halvorson, and V. L. Hofman

08:20 Evaluating Management Zone Technology and Grid Soil Sampling for Variable Rate Nitrogen Application
Kim L. Fleming, D. G. Westfall, and D. W. Wiens

08:40 Assessing Management Units on Rolling Topography
Sheilah C. Nolan, T. W. Goddard, G. M. Coen, and G. Lohstraeter

09:00 Spatial Variability of Phosphorus Retention Capacities of Various Fields
Jared R. Jenkins, D. A. Crouse, R. L. Mikkelsen, and R. W. Heiniger

09:20 **BREAK**

09:40 Variability of Soil and Landscape Attributes Within Sub-Field Management Zones
Jon J. Fridgen, N. R. Kitchen, and K. A. Sudduth

10:00 Predicting Crop Yields Using Soil Morphological Data
Neal S. Eash, C. Kost, G. W. Rehm, J. Strock, J. A. Lamb, J. Billotta, E. A. Dyck, and B. Potter

10:20 A Management Opportunity Index for Precision Agriculture
Alex B. McBratney, B. M Whelan, M. J. Pringle, and J. A. Taylor

Profitability

Chair: J. Lowenberg-Deboer, *Purdue University*

01:00 Spatial Econometric Issues in the Estimation of Site-Specific Yield Response Functions
Luc Anselin, A. N. Mbassa, and Robert Hornbaker

01:20 Grower Paths to Profitable Usage of Precision Agriculture Technologies
Douglas G. Tiffany, K. Foord, and V. Eidman

01:40 Precision Farming as a Risk Reducing Tool: A Whole-Farm Investigation
Caleb Oriade and M. Popp

02:00 Sequential Investment in Site-Specific Crop Management Under Output Price Uncertainty
Murat Isik, M. Khanna, and A. Winter-Nelson

02:20 Economics of Soil pH Sensors
Jess Lowenberg Deboer and A. Hallman

02:40 **BREAK**

03:00 Why Variable Rate Application of Lime has Increased Grower Profits and Acceptance of Precision Agriculture in the Southeast
Ronnie W. Heiniger and A. J. Meijer

03:20 Economic Value of Site-Specific P and K Information Under Alternative Soil Sampling
Sule Ochai, R. H. Hornbaker, D. G. Bullock, and T. Ellsworth

03:40 Economics of Variable Rate Applications of Phosphorus on a Rice and Soybean Rotation in Arkansas
Terry Griffin and J. Popp

04:00 Comparison of Site-Specific and Whole-Field Fertility Management in Michigan Soybeans and Corn
K. Q. Jones, R. Brook, N. Miller, O. Schabenberger, S. M. Swinton, and D. Warncke

04:20 **DISCUSSION**

CONFERENCE AGENDA

Morning

7:00   **Continental Breakfast Buffet,** Garden Court

7:00   **Registration Continues,** Grand Ballroom Foyer

8:00   **Concurrent Sessions:**

- Technology Transfer, Bloomington Room
- Integrated Approaches for a Practical Precision Agriculture, Grand Ballroom Center
- Management for Crop Qualities, Grand Ballroom West
- A to Z for Practitioners, Atrium 6

10:20   **Break,** Grand Ballroom East A&B

10:45   **General Session,** Precision Agriculture, Biotechnology and E-Business: Sharing Data for Better Solutions, Dr. John Ahlrichs, Rooster.com, Grand Ballroom Center and West

11:45   **Closing Remarks,** Grand Ballroom Center and West

BLOOMINGTON ROOM

Technology Transfer

Chair: N. Kitchen, USDA-ARS, *University of Missouri*

08:00   **KEYNOTE:** Diffusion of Precision Agriculture
Peter Nowak and Fran Pierce, University of Wisconsin and Michigan State University

08:40   Adoption of Precision Agriculture Technologies by U.S. Farmers
Stan G. Daberkow and W. D. McBride USDA ARS

09:00   What's Obstructing the Wider Adoption of Precision Agriculture Technology?
Simon E. Cook, R. G. V. Bramley, and M. L. Adams

09:20   Benefits and Problems of Using Yield Maps in the U.K. - Survey of 100 Farmers
Simon Griffin

09:40   Developing a Precision Agriculture Curriculum for On-farm Research - The Missouri Precision Agriculture Masters Program
J. Glenn Davis, B. O. King, and R. J. Birkenholz

10:00   **DISCUSSION**

10:20   **BREAK**
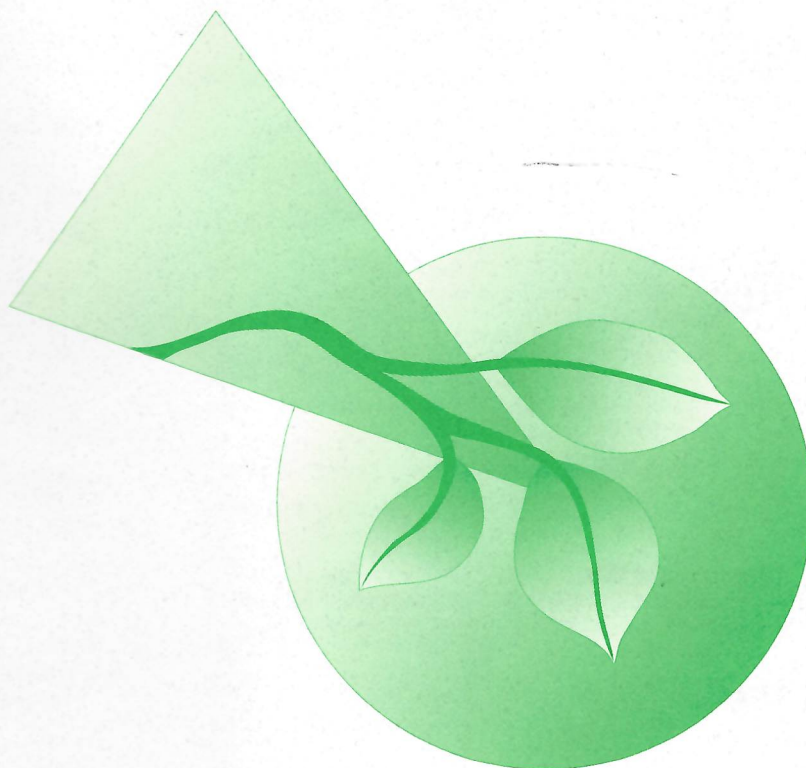
GRAND BALLROOM CENTER

Integrated Approaches for a Practical Precision Agriculture

Chair: A. McBratney, *University of Sydney, Australia*

08:00 Dealing with Variation in Space and Time: The Challenge for a Forward Looking Approach to Precision Agriculture
Johan Bouma

08:20 An Integrated System for Precision Agriculture in Bananas
Jetse J. Stoorvogel and R. A. Orlich

08:40 An Operational, Forward-Looking Approach to Precision Agriculture: A Case Study for Dutch Arable Farming
Jeroen B. Van Alphen, J. J. Stoorvogel, and P. D. Peters

09:00 Deriving Regression Equations (Meta-Models) from Deterministic Simulation Modeling for Crop Fertilization
M. Peeters and H.W.G. Booltink

09:20 Using Remote Sensing Data to Improve Simulation Modeling for Precision Agriculture
Virginie Epinat, H. W. G. Booltink, and S. de Jong

09:40 Proximal Sensing as a Tool in Precision Agriculture
Dennis J.J. Walvoort, J. Bouma, J. J. de Gruijter, and P. D. Peters

10:00 **DISCUSSION**

10:20 **BREAK**

GRAND BALLROOM WEST

Management for Crop Qualities

Chair: P. Fixen, *Potash & Phosphate Institute*

08:00 Grid Cell Size Needed For Sugar Beet Nitrogen Recommendations in Southern Minnesota: Root Quality and Recoverable Sugar
Mark Bredehoeft, J. A. Lamb, and G. W. Rehm

08:20 Spatial Variability of Sugar Beet Yield and Quality and Their Relation with Soil Properties
Jaap Van Bergeijk, D. J. Medema, and D. Goense

08:40 Zoned Management of Cotton Fiber Yield and Quality
Judith M. Bradow, R. M. Johnson, P. J. Bauer, and E. J. Sadler

09:00 Corn Oil, Protein and Starch Variability as Affected by Fertility and Field Position
Paul M. Porter, G. Malzer, D. Mulla, J. Strock, P. Robert, and M. Mano

09:20 Corn Grain Quality as Affected by Soil Properties, Management, and Landscape
Tony Nugteren and P. C. Robert

09:40 Economic Aspects of Precision Farming
Bernard Kilian

10:00 **DISCUSSION**

10:20 **BREAK**
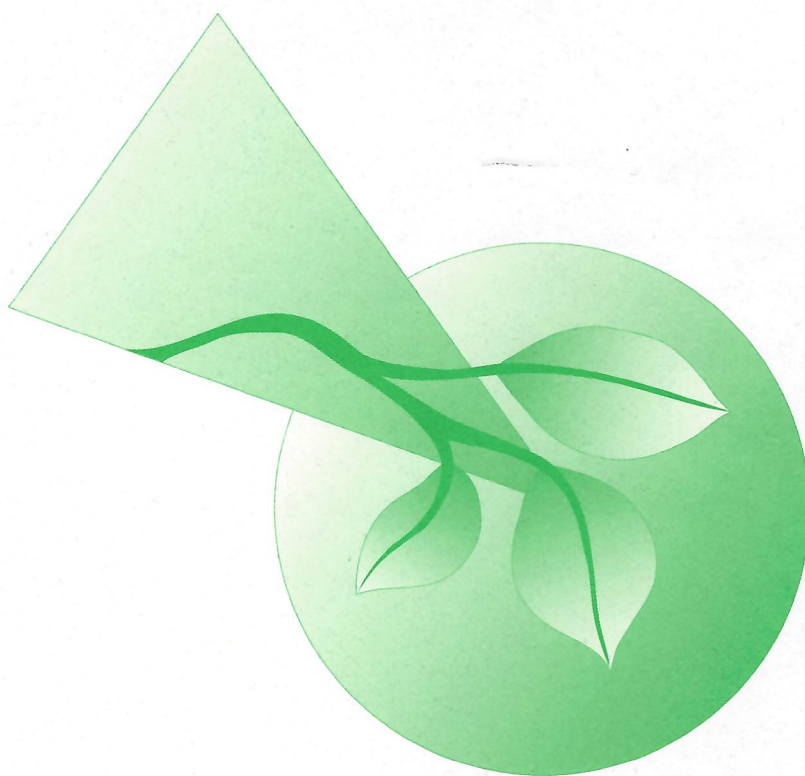
A TO Z FOR PRACTITIONERS SESSIONS

The A to Z Track presents "field ready" information in interactive sessions is essentially designed for consultants, dealers, and growers. It is one of five session tracks open to all participants at the 5th International Conference on Precision Agriculture and Other Precision Resources Management.

ALL SESSIONS HELD IN ATRIUM 6
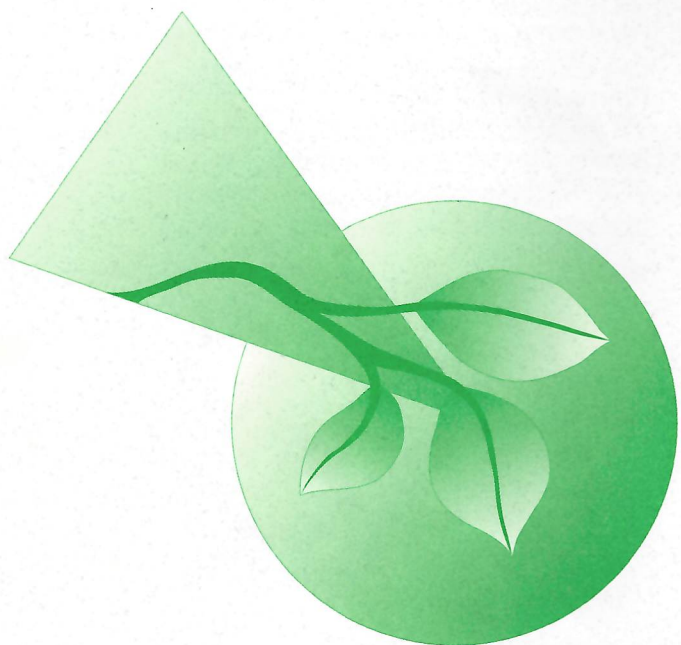
Morning

8:00-10:00	**General Sessions**

PRECISION SERVICES SESSION
Strategies for integrating precision services into your business.

Moderator: Kellen Sullivan, *Precision Agriculture Center, University of Minnesota*

10:20	**Welcome to A to Z Session** *Kellen Sullivan, Associate Director, Precision Agriculture Center*
10:30	Good Data Sells Itself *Lance Murrell, Erny's Fertilizer Service*
11:00	Strategies for Retailers and Consultants *Jeff Nesbitt, Precision Partners*
11:30	The Service Game: Does It Pay to Play? *John Mann, SOILTEQ*
12:00-1:00	**Lunch,** Garden Court

Afternoon

Moderator: H. F. Reetz, Jr., *Potash & Phosphate Institute*

SPATIAL DATA WAREHOUSES
Gleaning knowledge from all that data

1:05	Why Do We Need a Database? *Tom Krill, VantagePoint Network*
1:30	Bringing Profit with New Technology *Joe Tevis, SOILTEQ AgCentral Service*
1:55	Bringing Precision Agriculture Down-to-Earth *David Waits, SST Development Group, Inc.*
2:20	Deriving Knowledge from Data and Tying the Weather to the Land *Adrienna Logan, mPower3*
2:40	**Break,** location near meeting room

INFORMATION MANAGEMENT APPLICATIONS

3:00	Case study: Lessons Learned in Farm II *Don Lamker, Cargill*
3:30	Logistics Planning: GPS/GIS Used to Optimize Equipment and Personnel *Fran Heitkamp, National Agri-Services, Inc.*
3:40-6:00	**Poster Session,** Grand Veranda Ballroom
4:00	How to Handle the Information Onslaught *Sandra Potthoff, Carlson School of Management, University of Minnesota*
5:00-6:00	**Cash Bar,** near exhibits and posters

TUESDAY, JULY 18

Morning

Moderator: Maggie Jones, *GeoFarm, Inc.*

8:00-9:20   **GROWER PANEL**
Managing for growth or incremental improvements, water quality protection, or commodity crop differentiation—panel members will discuss diverse strategies for increasing returns with precision agriculture. *Participants include: John Engles, Lake Crystal, Minnesota; Ken Dalenberg, Mansfield, Illinois; Gary Wagner, Crookston, Minnesota; Todd Golly, Winnebago, Minnesota*

9:20-9:40   **BREAK,** near exhibits and posters

9:40-10:40   **CYBERFARM**
A session that explores the information management side of precision agriculture.

Precision Info on the Net
Stuart Pocknee, NESPAL/University of Georgia and founder of AgriSurf

Precision Farming Data: From Agronomy to Business Results
Marc Vanacht, Ag Business Consultants

10:40-12:00   **WORKGROUP,** (see your numbered badge for assignment)

2:00-1:00   **Lunch,** Garden Court

Afternoon

Moderator: Scott Murrell, *Potash & Phosphate Institute*

ON-FARM DATA INTERPRETATION

1:00   **What Do I Need for Data-driven Decisions: How Do I Make Precision Pay?**
Todd Peterson, Pioneer Hi-Bred International, Inc.

1:30   **Calibration and Other Joys of Yield Monitors**
Tom Colvin, National Soil Tilth Lab, USDA-ARS

2:00   **A Software Tool for Designing and Analyzing On-farm Experiments**
Quentin Rund, PAQ Interactive

2:40   **Break,** location near meeting room

3:00   **Making Sense of Multiple years of Yield Data**
Gregg Carlson, South Dakota State University

3:30   **Enterprise Analysis: Evaluating Your Operation**
Kent Olson, University of Minnesota

4:00   **Put Public Information to Work for You**
Hal Watkins, Heartland Co-op

5:00-6:00   **Cash Bar and Banquet,**
near exhibits and posters

WEDNESDAY, JULY 19

Morning

Moderator: Jon Arvik, *Remote Sensing Technologies Center, Mississippi State University*

PRECISION APPLICATIONS WORLDWIDE
Learn how people around the world are using Site-Specific Resource Management, satellite imagery and weather data to enhance their decision making.

8:00   **Image Analysis for Satellite Imagery**
Chuck Nichols, EarthScan

8:35   **Putting Weather Data to Work**
John Mascoe, ADCOM Telemetry

9:05   **Precision Ag Adoption in the US**
Paul Schrimpf, Farm Chemicals Magazine

9:25   **What is South America Doing in Precision Ag?**
Clyde Fraissee, Cargill

9:55   **A Look at Precision Applications in Europe**
Damien Lepoutre, GEOSYS

10:20   **BREAK,** near exhibits and posters

10:40-12:00   **GENERAL SESSION**

WORKGROUP SESSION

Your name badge is numbered in the lower left-hand corner —
this number corresponds with the room that you are assigned to.
Please find that number in this group and find the room
indicated for the Workgroup Session.

The two discussion topics are:

What decision support tools are needed in the future

Suggested changes for the next conference

Each workgroup will discuss both topics and provide
a discussion summary to the committee chair.

Number	Room Name
1	**Grand Ballroom Center**
2	**Grand Ballroom Center**
3	**Grand Ballroom West**
4	**Grand Ballroom West**
5	**Atrium 4**
6	**Atrium 6**
7	**Atrium 8**
8	**Atrium 7**
9	**Atrium 1**
10	**Atrium 2**
11	**Atrium 3**
12	**Atrium 8**
13	**Vista 2203**
14	**Vista 2206**
15	**Vista 2205**
16	**Vista 2207**
17	**Vista 2208**

Posters are grouped by theme within each track

Natural Resource Variability

BOARD NO.	TITLE

1   Influences of Soil Chemical and Physical Properties on Site-Specific Cotton Production
Brian D Ward and M. S. Cox

2   Hillslope Chronosequence of EM-38, Soil Temperature, and Soil Moisture Readings as Influenced by Selected Soil Properties
Wes A. Nugteren, D. D. Malo, T. E. Schumacher, J. A. Schumacher, C. G. Carlson, D.E. Clay, S. A. Clay, M. M. Ellsbury, and K. Dalsted

3   Interaction Among Soil-Water, Plant Population, Soil Depth, Texture, Crop Growth, Yield Components, Terrain Attributes and Impacts on Spatial Yield Pattern of Corn
Ricardo P. Braga and J. W. Jones

4   Variation in Plant Available Water and Hydraulic Conductivity Along Transects of Different Textured Soils
Gunnar Kirchhof, P. Smith, and L. Hyson

5   The Site Specific Measurement of Soil Compaction and Its Use in the Analysis of Crop Limiting Factors in the North Central Region
Tom McGraw

6   An Analysis of Tillage and Water Erosion over a Complex Landscape
Joseph A. Schumacher, M. Lindstrom, and T. Schumacher

7   Estimation of a Soil Productivity Index on Claypan Soils Using Soil Electrical Conductivity
David B. Myers, N. R. Kitchen, R. J. Miles, and K. A. Sudduth

8   Evolution of In-field Variability in Corn Production
P. Chery, B. le Clech, and G. Grenier

9   Small-Scale Spatial Variability of Available Phosphorus Contents in the Soil and Its Relationship to Animal Behavior
Silvia Haneklaus, J. Berk, and E. Schnug

10   Spatial and Temporal Stability of pH, Soil Test Phosphorus and Soil Test Potassium
John A. Lamb and G. W. Rehm

11   Spatial and Temporal Variability of Soil Properties as Related to Irrigated Corn Management
Antonio M. Coelho, J. W. Doran, and J. S. Schepers

12   Spatial Associations Between Crop Yield and Soil Characteristics in Corn and Soybean
Steven H. Moore and M. C. Wolcott

BOARD NO.	TITLE

13   Evaluation of Soil-Site Factors Responsible for Yield Variations in Two Southern Illinois Farm Fields
Terry D. Wyciskalla, E. C. Varsa, S. K. Chong, S. A. Ebelhar, S. J. Indorante, and M. McCauley

14   Interpreting Yield Patterns for California Rice Precision Farm Management
A. Roel, R. E. Plant, G. S. Pettygrove, J. F. Williams, J. A. Young, and J. Deng

15   Grid Soil Sampling: Comparisons of Grid Size with Landscape- and Soil Texture-Based Sampling Strategies in the Southern Plains
Kevin F. Bronson, R. J. Lascano, J. D. Brooker, J. Booker, J. W. Keeling, T. L. Archer, S. Machado, E.D. Bynum, Jr. and H. Li

16   Accuracy of Yield Map Zones and Prediction According to In-season Plant Indicators and Soil Characteristics
Bernie Vigier, N. B. McLaughlin, B. L. Ma, and L. M. Dwyer

17   Determining the Impact of Approaches to Classify Nutrient Management Zones
Jiyul Chang, D. E. Clay, C. Gregg Carlson, S. A. Clay, and C. Reese

18   Developing Techniques for Defining Management Zones in the SE Coastal Plain
Betsy K. Gerwig, E. John Sadler, and D. E. Evans

19   Evaluation of the Accuracy of a Central Iowa Soil Survey and Implications for Precision Soil Management
Eric C. Brevik, T. E. Fenton, and D. B. Jaynes

20   Remote Sensing Techniques as Soil Survey Tools in Lacustrine-Derived Soils, Central Iowa
Eric C. Brevik, T. E. Fenton, and D. B. Jaynes

21   Using GPS, GIS, and Remote Sensing as a Soil Mapping Tool
D. Keith Morris, G. C. Steinhardt, R. L. Nielsen, W. Hostetter, S. Haley, and G. R. Struben

22   Analysis of Precision Farming Data with Classification Trees
Gerald W. Buchleiter and M. K. Brodahl

23   A New Method for Equi-Water Content Line with Classical Ratio of GM(1,1)
Mei-Li You, J. Chau Wen, and J. Horng Wen

24   GM(1,1) Model on Infiltration Processes
Hsiang-Chieh Chang, J. Chau Wen, and J. Horng Wen

BOARD NO.	TITLE
25	Estimating Corn Yield Using Temporal Yield Data and Terrain Attributes *Tom C. Kaspar, T. S. Colvin, D. B. Jaynes, D. L. Karlen, D. E. James, D. W. Meek, D. Pulido, and H. Butler*
26	Spatial Distribution of Potato Cyst Nematode and the Potential for Varying Nematicide Application *John V. Stafford and K. Evans*
27	The distribution of the Soybean Cyst Nematode in Soybean Fields with Low Estimated Egg Population Densities *Adam Kaszubowski and A. E. MacGuidwin*
28	Spatial Distribution of Soil-Dwelling Stages of Northern Corn Rootworm in Relation to Measurable Soil and Crop Characteristics *Michael M. Ellsbury, D. D. Malo, D. E. Clay, S. A. Clay, and C. G. Carlson*
29	Distribution of Potato Leafhopper in Commercial Alfalfa Fields in Michigan *Marcus McNabnay, R. Leep, C. DiFonzo, R. Brook, and D. Warncke*

Managing Variability

BOARD NO.	TITLE
30	Agronomic and Economic Evaluation of Variable-Rate Corn Seeding on Missouri Soils *Mace G. Bauer, J. Glenn Davis, K. A. Sudduth, and S. T. Drummond*
31	Alternative Data Managements and Interpretations for Strip Trials Harvested with Yield Monitors *Antonio P. Mallarino, M. Bermudez, D. J. Wittry, and P. N. Hinz*
32	On-Farm Research: Strip Trial with Zn Applications on Maize to Isolate Variations in Crop Response by Relative Soil Condition *Wayne H. Thompson*
33	Using Yield Maps to Diagnose Specific Limitations to Crop Growth *Simon E. Cook, R. J. Corner, and M. L. Adams*
34	Utilizing Site Specific Technology to Monitor Changes in Selected Variables that Impact Arkansas Soybean Production *Lanny O. Ashlock, J. D. Beaty, J. W. Haynes, G. W. Huitink, and R. A. Klerk*
35	Strategies for Establishing Management Zones for Site Specific Nutrient Management *A. Luchiari, J. Shanahan, M. Liebig, M. Schlemmer, J. Schepers, D. Francis, and S. Payton*

BOARD NO.	TITLE
36	Precision Farming Research in Western North Dakota Using Variable Fertilizer Application and Yield Monitoring *Vernon Hofman, D. Franzen, and J. Hanson*
37	Precision Farming to Improve N Management on an Irrigated Potato-Barley Rotation *Jorge A. Delgado, H. Duke, M. Shaffer, R. Follett, L. Kawanabe, and A. Stuebbe*
38	Evaluating the Influence of Variably Applied Potassium on Yield Variations in Two Southern Illinois Farm Fields *Stephen A. Ebelhar, T. D. Wyciskalla, E. C. Varsa, S. K. Chong, S. J. Indorante, and M. McCauley*
39	Spatio-Temporal Variation of AEM-P in a Corn Field *Regis R. Simard, A. N. Cambouris, and M. C. Nolin*
40	Site Specific Management: Zinc Deficit in an Irrigated Corn Field *Adriana Garcia Lamothe and A. E. Gimenez*
41	Precision Farming in a Tomato Production System *U. A. Rosa, S. K. Upadhyaya, M. Koller, M. Josiah, and S. Pettygrove*
42	Site Specific Management of Potatoes *R. Colin McKenzie, T. W. Goddard, S. A. Woods, J. Rodvang, L. Hingley, and T. Harms*
43	Potential for Precision Management of Cotton Fiber Quality *Richard M. Johnson and J. M. Bradow*
44	Surface Irrigation and Precision Crop Management *Floyd J. Adamsen, E. M. Barnes, D. J. Hunsaker, E. Bautista, and A. J. Clemmens*
45	Development and Implementation of Large-Scale Spatially Variable Insecticide Experiments in Cotton *Michael R. Seal, K. Dupont, M. Bethel, J. Johnson, J. L. Willers, K. Hood, and J. Hardwick*
46	Identifying Soybean Phytopthora Tolerant and Non-Tolerant Variety Management Zones Using Soil Electrical Conductivity *Cheryl L. Reese, D. E. Clay, C. Gregg Carlson, R. Berg, and D. Diedrich*
47	Resin Extractable Ratios of Elements in Soil and their Effect on Crop Production: Mg and Ca on Soybean Seed Yield *Alan Olness, R. Gesch, N. Barbour, and J. Rinke*

New Applications around the World

Engineering Technology

Remote Sensing

Technology Transfer/ Education

www.Spatiallab.ncsu.edu

www.precisionag.ncsu.edu.

EXHIBITOR LIST

Ag Leader Technology
2202 S. Riverside Drive
Ames, IA 50010

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5174 30th St. NE
Maddock, North Dakota 58348

Astrium
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Concord Environmental Equipment
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Hawley, MN 56549

Dealer PROGRESS Magazine
Suite 314
930 Kehrs Mill Road
Bellwin, MO 63011

Doane Agricultural Services
11701 Borman Drive
St. Louis, MO 63146

Farm Works Software
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Hamilton, IN 46705

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Flanigan, IL 61740

John Deere
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101 Philip Drive
Norwell, MA 02061

KVH Industries
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Middletown, RI 02842

Linnet-The Land Systems Company
1600-444 St. Mary Ave.
Winnipeg, Manitoba, Canada R36 3T1

MicroImages, Inc.
11th Floor, Sharp Tower
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Springfield, IL 62703

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8200 Westglen
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Potash & Phosphate Institute
3579 Commonwealth Road
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Precision Partners Inc./Spectra Precision
PO Box 463
Fergus Falls, MN 56538

Raven Industries
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Sioux Falls, SD 57117-5107

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Fort Collins, CO 80525

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Germany

SOILTEQ
5720 Smetana Drive
Minnetonka, MN 55343

SPOT Image Corporation
1897 Preston White Drive
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SST Development Group, Inc.
824 N. Country Club Road
Stillwater, OK 74075

Spectrum Technologies, Inc.
23839 W. Andrews Road
Plainfield, IL 60544

Trimble Navigation
9290 Bond St.
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Winnipeg, MB R3T 1T4

Veris Techologies
601 N. Broadway
Salina, KS 67401

(Exhibitor list as of June 28)