Joint RTK Accuracy Study in Eastern Colorado **by: Mike Petersen, Orthman Agronomist**

In 2007 the study to determine the effectiveness of GPS guidance and Real Time Kinematic (RTK) accuracy was as important as purported to be with the companies who have developed the constellation of satellites signals to assist in guiding machinery in farming. It is a continuation of the cooperative study at the Irrigation Research Foundation with John Deere, Monsanto, IRF, and Orthman to measure and observe the effects of precision applied fertilizer and see placement. As we carried out in 2006 of placement of fertilizer and then subsequent seeding at 0 inch offset, 4 inch offset, and 8 inches offset away from the banded fertility we followed the same procedure in 2007. Applying the N-P-K liquid fertilizer at 4 inch depth and 9 inch depth with a 8420 John Deere tractor set up with the RTK level Starfire GPS guidance pulling the Orthman 1tRIPr. We returned within weeks with the same A-B lines to plant.

From emergence to V3 stage, the Dekalb corn in 0 inch and 4 inch offset plots stood out as a better stand, crop stature and to harvest than the 8 inch offset plots. Root impacts are seen in Table 1 and yields in Table 2. At 55 days after emergence (DAE) we excavated numerous corn plants to measure root systems and count all those inches which offer tell-tale evidence of crop health and soil tilth.

Table 1. Study at IRF to determine value of RTK (±1 inch), 4inch offset (±4-6 inches), & 8 inch offset (±8-16inches offset) in seed placement in strip-tillage system at 55 DAE

55 DAE	0" offset	4" Offset	8" Offset
Dia. Of stalks(range)-mm	20-27	19-26	15-22
Avg stalk dia.-mm	23.3	22.3	20.1
Linear Inches roots	8575	7011	4992

Discussion:

Our visual observations throughout the growing season confirmed that the more accurately placed seed in relation to the fertilizer banded and strip-tillage zone the higher the yield. As you can see in Table 3 the yields are 12 and 19% improved from 0 inch offset and the 8 inch offset. From early on in late May the growth in leaf size, height and stalk diameter at 3 inches above ground surface level indicated the 0 inch offset was a healthier plant. The corn root system was much more robust at 55 DAE as shown in Table 2. We feel confidant that we can say this plant below ground was being fed better to grow better ears of corn.

Table 2. Yield results from 2007 RTK Placement Study

RTK **Dimension	Plot #	Rows	Row Length	Weight Harvested	Harvest Moisture	Yield (bu/ac)	Test Wt. (lbs/bu.)
0	1	4	1238	2944	14.0	187.2	57.0
4	1	4	1214	2830	15.6	180.0	58.0
8	1	4	1162	2274	16.1	150.2	58.5
0	2	4	1230	2758	15.0	174.4	57.8
4	2	4	1222	2804	14.8	178.9	57.0
8	2	4	1228	2450	15.3	154.6	58.0

RTK** - dimension in inches seed placement from center of the fertilized strip

As we now cross our arms and reflect in 2008, use of GPS during planting and strip-tilling can yield more corn two years running in 2006 and 2007. The 4 inch offset is right in between not to say it is left out of the picture either. You still can choose what satisfies your management system on your farm, if it is ours well – the most accurate GPS says volumes. A 1000 acres or 5000 acres of corn tilled and planted as done in this study can tell the story; you run the numbers!

We publicly thank John Deere for being interested and providing the GPS equipment, tractor, and Crop Systems Specialist, Yancy Wright in this project to offer growers in the Western Corn Belt what are the differences above ground and below ground.