

Farming by Satellite

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80/80/80

First 80 Years

1837 John Deere Makes
Self Scouring Plow



Second 80 Years

1918 John Deere Buys
Waterloo Boy Tractor



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Next 80 Years...



In the beginning...



- GPS introduced on combines - Mid 1990s
 - Yield Documentation

Farming by the foot

- Variable Rate Applications
 - Seed
 - Chemicals
- Enhanced Documentation
 - Management
 - Compliance



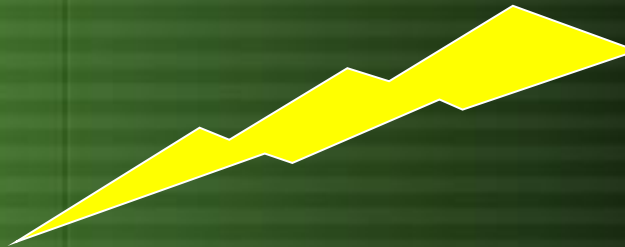
High cost of implement overlap

- Up to 10% or more overlap on every pass
- Wastes fuel, chemicals, fertilizer, seed
- Drag on efficiency, productivity
- Under-utilization of equipment
- Environmental concerns

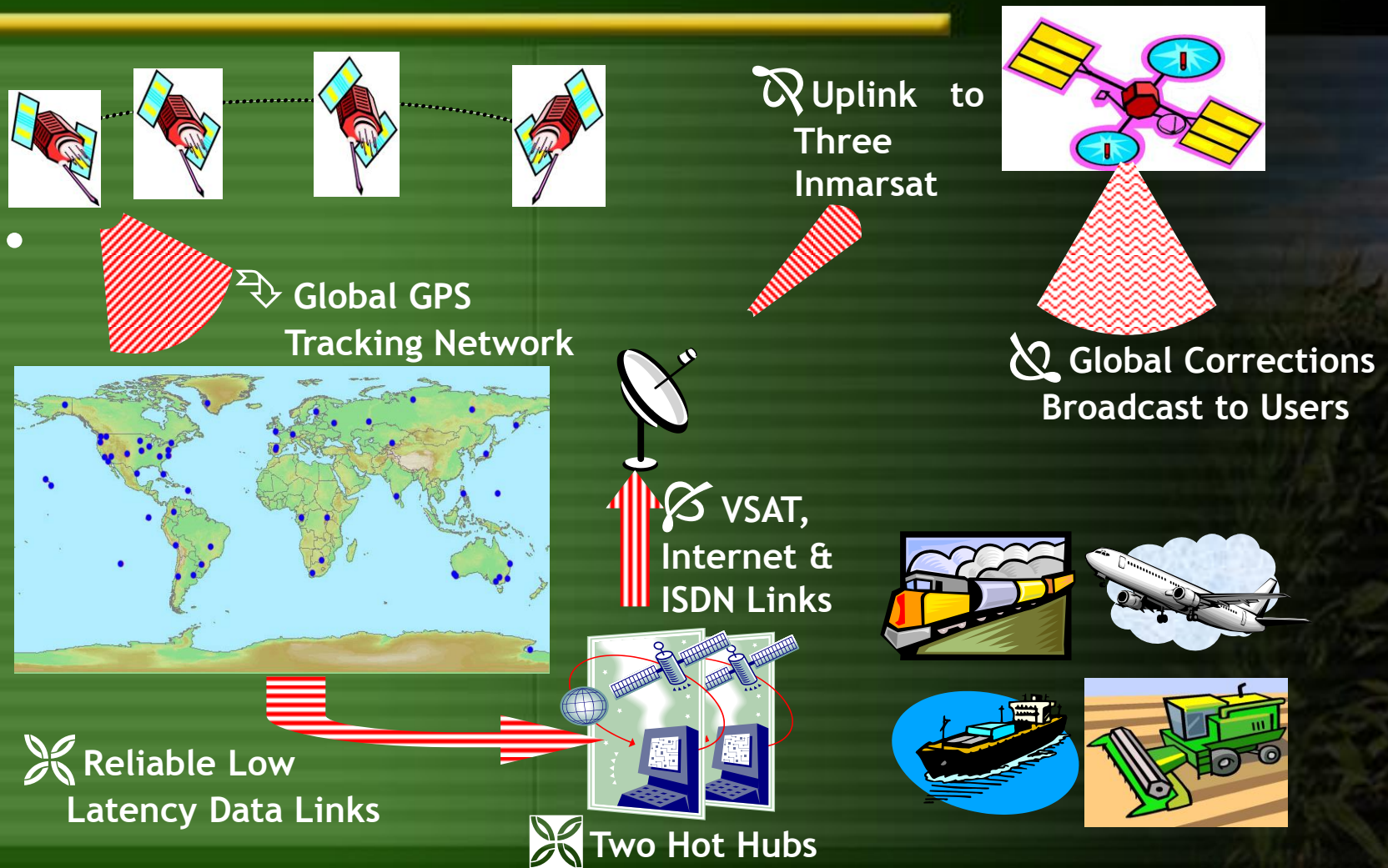


GreenStar GPS Guidance

GPS



StarFire™ DGPS System Overview



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The NavCom™ iTC StarFire Receiver

- Is a dual-frequency (L1 & L2) receiver with WAAS and Inmarsat StarFire correction channels
- The L1 receiver has direct access to the L1 signal
- The P-code L2 signals cannot now be directly accessed.
- Since the L1 signal also has the P-code present, the L2 signal can be accessed by cross-correlation with the L1 signal—with significant loss of signal-to-noise.



StarFire™ RTK & RTK Extend™

January 2004

- High accuracy and repeatability: ± 1 in (2 cm)
- Receivers on machine and base station
- Base station transmits radio correction signal to eliminate GPS drift
- Vehicle can travel same path or track
- Repeatability is the key advantage
- RTK Extend™ uses the StarFire correction signal to extend operation to areas where the communication signal from the base station is unavailable



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Benefits of GPS Guidance



- Minimizes input costs
- Reduces operator fatigue
- Improves productivity



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Guidance Payback

- “The pay off on a DGPS guidance system can be as little as a year to a year-and-a-half, so it holds the potential of being a high-return investment.” Purdue University Study



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Benefit of the new L2C signal

- The recent launch of the first modernized GPS Satellite allows direct access to the L2 signal
- This gives a much stronger signal tracking availability for the removal of ionospheric refraction effects upon the GPS signals
- The direct benefit is to make guidance by GPS significantly more robust.
- Example: Signal and accuracy is often lost along field boundaries where trees interfere with the signal



Benefit of the new third frequency (L5)

- The launch of modernized GPS satellites in 2007 with the L5 frequency will enable improved RTK performance. Three frequencies allow:
 - Faster initialization of the RTK whole-cycle ambiguities
 - Significantly longer operating distances from the reference receiver and therefore fewer reference receivers required to cover the same area
 - Unique Deere/NavCom method of using the three frequencies for RTK ambiguity resolution—Patent No. 6,934,632



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Questions?



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