GPS independent communication for Smart Grids – Net Insight experience from video broadcast markets
Net Insight – Our background is real-time but for TV and media

- Net Insight is a Swedish public company with headquarters in Sweden
- More than 160 customers in over 50 countries
- Enhancing quality and control of mission-critical services over IP and optical networks using its **Nimbra™ MSR** (Media Switch Router) products
Reasons for GPS independent TV distribution

• Reliability – GPS is vulnerable to:
  • Jamming – intentional and unintentional
  • Spoofing
  • Bad weather conditions (snow, sand)

• Sovereign control
  • US military system

• Key considerations implementing a terrestrial time synchronization solution.
  • Security
  • Reliability
  • Scalability
  • OPEX
Net Insight official Digital TV References

Net Insight has implemented Time Transfer in over 15 nationwide Digital Terrestrial TV implementations

- Norway
- The Netherlands
- Korea
- Germany x 3
- Slovakia
- Finland
- Denmark
- Estonia
- East Europe
- Lithuania
- China (multiple reg)
- Italy (RAS)
- Ireland
- Luxemburg
- Austria
- Mauritius
- Phillipines
- Brasil
- Sri Lanka
- Argentina
- Sweden
- Belgium
- Slovenia
- Eastern Europe
- Cyprus FTA
- Poland
- Cyprus pay-TV
- Marocco
- Middle East country

Time Transfer = used as primary synchronisation
Time Transfer was developed for Digital Terrestrial TV

• One box solution - No need for IP/video adapters nor external routers/switches
• **GPS independence** - synchronizing TV transmitters to send within 1 us time difference
• Multi-service networks
  • Add E1/T1 for digital radio distribution and mobile backhaul
  • Easily handle all IP/Ethernet data and video/audio contribution in same network
• Network protection
  • Rerouting and 1+1
Time distribution for Phasor measurement

- Exact time (~1 us) is critical in power transmission systems
- GPS time distribution is vulnerable to attacks
  - Spoofing, Jamming and weather dependent
- Net Insight offers an integrated Time Transfer function independent of GPS and resilient to cyber attacks due to physical separation of time transfer (control plane) and data plane
- Built-in protection switching and redundancy
What else can we bring to SmartGrid Networks

Smart Transport for Smart Grids

• GPS free time distribution using Time Transfer
  • Spoof and disturbance free time signal distribution (10 MHz and 1 PPS) for syncrophasors and WAMs
  • More scalable and better security than e.g., IEEE1588 in the WAN
    • 15 national network implementations. Handling over 500 transmitters in Norway
    • Complementing IEEE1588 over wide area networks

• High Security and integrity
  • Services, including Time Transfer, are truly separated (no interference)
  • Resilient towards service denial and masquerading attacks

• Real time properties for WAMPACs
  • Low and predictable delay suitable for tele protection and synchrophasors
    • Real-time control loops (closing the loop)

• Multi-service network including High QoS video surveillance and PMU collection
For more information

• Find white paper on Time Transfer: [http://www.netinsight.net/Global/Documents/Products/White%20papers/Net_Insight_Time_Transfer_WP.pdf](http://www.netinsight.net/Global/Documents/Products/White%20papers/Net_Insight_Time_Transfer_WP.pdf)

• Come and see longer presentation on Time Transfer and Nimbra quality and protection mechanisms at DMNTT breakout session

• Net Insight home page ([www.netinsight.net](http://www.netinsight.net))

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