

# CGSIC Industry Forum, ENC-GNSS 07

## New Technologies and Trends

28 May 2007, Geneva, Switzerland

- when it has to be **right**

**Leica**  
Geosystems

# Leica Geosystems in Brief

- Leading international supplier of solutions for 3D measurements and geomatics using our technology bases in Switzerland, the USA and Australia
- CHF 689 million turnover worldwide
- Sales from regions: Europe 50%, USA 30%, Asia 20% .
- 2400 employees worldwide (950 in Switzerland)
- 400 employees in Research and Development (200 in Switzerland, 200 in USA)
- Research and Development expenditure 10% of sales (approx CHF 70 m)
- Pioneers of numerous technological developments
- Working in collaboration with a worldwide network of partners, universities and industry

# Some 'Futurology' Done by Tom Stansell Back in 1983...



## GPS IN THE YEAR 2000

BY

**THOMAS A. STANSELL, JR.**  
**MAGNAVOX ADVANCED PRODUCTS AND SYSTEMS COMPANY**

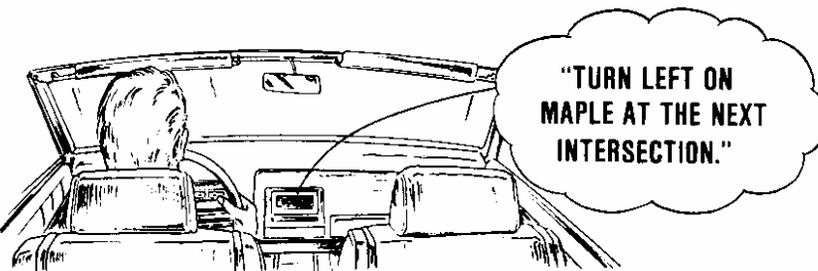
2829 MARICOPA STREET  
TORRANCE, CA. 90503  
LATITUDE 33° 50'.467 NORTH  
LONGITUDE 118° 20'.262 WEST

PRESENTED AT  
THE SPECIAL DOD SYMPOSIUM  
ON THE  
GLOBAL POSITIONING SYSTEM (GPS)  
ARLINGTON, VA.  
APRIL 22, 1983

# Some 'Futurology' Done by Tom Stansell Back in 1983...

Magnavox  
APS<sup>CO</sup>

## AUTOMOBILE NAVIGATION IN THE YEAR 2000



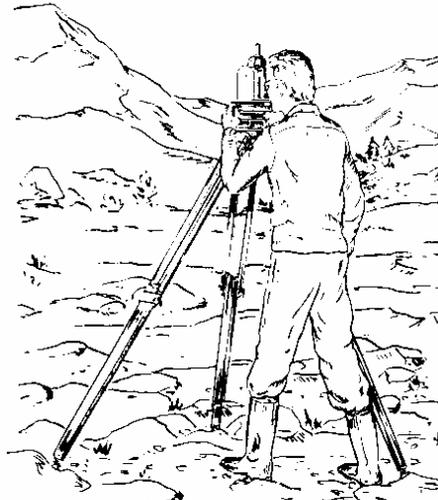
"TURN LEFT ON  
MAPLE AT THE NEXT  
INTERSECTION."

- YEAR 2000 SYSTEM
  - GPS FOR POSITION
  - DIGITAL MAP FOR DISPLAY
  - VOICE SYNTHESIZER FOR DRIVING ADVICE
  - DIGITAL RADIO LINK FOR DIFFERENTIAL CORRECTIONS AND HAZARD REROUTING INSTRUCTIONS.
- JAPANESE AUTOMOBILE NAVIGATION EQUIPMENT WAS ON THE MARKET IN 1982.
- FORD IS DEMONSTRATING TRANSIT SATELLITE NAVIGATION WITH A COMPUTERIZED MAP.

383-2108

Magnavox  
APS<sup>CO</sup>

## SURVEYING WITH GPS IN THE YEAR 2000



- GPS PROVIDES 1 CM RELATIVE POSITIONING ACCURACY WITHIN ONE HOUR ON SITE.
- COMBINED WITH CONVENTIONAL OPTICAL AND EDM INSTRUMENTS, GPS IS AN INTEGRAL PART OF EVERY SURVEY JOB.

NOTE: ACCESS TO  $L_2$  IS A MUST FOR LONG DISTANCE SURVEYS.  
THE C/A CODE OR EVEN A CARRIER ON  $L_2$  WOULD BE EXTREMELY HELPFUL.

383-2109

# The Future Becomes True

- Complete Integration of a GPS System With a TPS System
- Easy and Affordable Switch Between TPS and GPS Systems to Optimize Time and Resources
- User Learns Easily, and Adapts Faster to Both Technologies

*TPS1200*



*GPS1200*



+

=

*SmartStation*



# Now, Our Own 'Predictions' Based On GNSS Technology and Leica's Trend

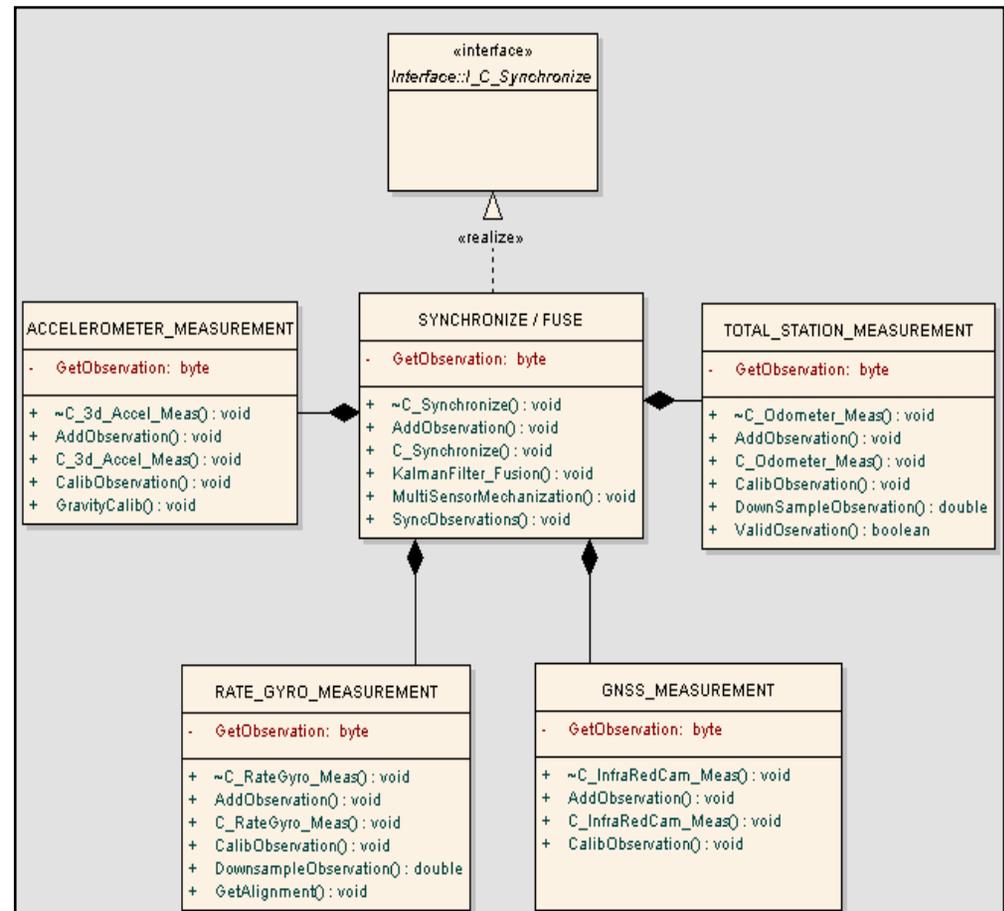
We will Continue to Rely Primarily On Current / Future GPS Signals, And Their Integration With Other GNSS Signals. And:

- GNSS Measurements are Combined With Other Sensor Measurements
- GNSS Frequency Diversity is a Reality, Multi-Sensor Hardware (e.g. IMUs) is Also Available and Becoming Very Cost Competitive. So What Next?



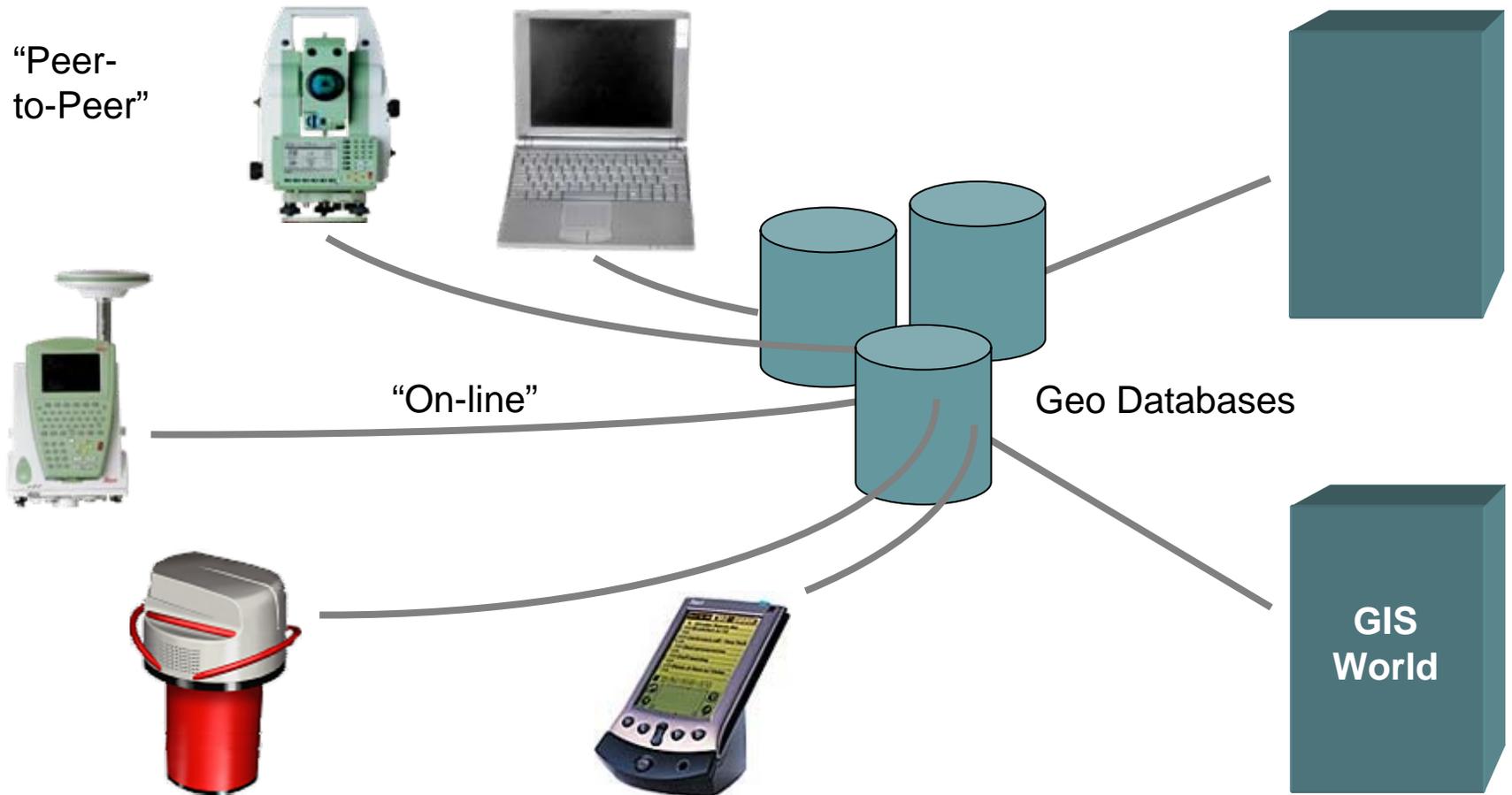
# Now, Our Own 'Predictions' Based On GNSS Technology and Leica's Trend

- Smart Multi-Sensor Fusion Mechanization, Based on Specific Sensor Characteristics and on the Application in Sight
- Use of These Systems in a Multitude of Applications, Where the User Has Always Access to the Best Position Solution Regardless of Its Location.
- The Premise of GPS Being an 'Ubiquitous' System Will Be, Ironically, Fulfilled With the Aiding of Different Sensors Which, Before GPS, Were not Foreseen



# Interoperability

## Sensors and Software Allowing Seamless Dataflow





**THANK YOU**