Role of Manufacturers to support Geodetic Infrastructure

Neil Ashcroft
Leica Geosystems
Information Technologies
Hexagon’s Corporate Strategic Direction

- Broaden capabilities
- Narrow the GAPs between Real and Digital World
End User - Manufacturer Relationship

What is expected?

- Deliver / Provide Appropriate products for Measurement tasks
  - Total Stations – Mechanical, Automated, Imaging…
  - GNSS – GIS, GPS, GNSS, Single Frequency, Multi Frequency
  - Laser Scanners – Fixed, Mobile
  - UAS
  - Lasers, Levels, Accessories etc
- Reliable products
  - Local Servicing and scheduled Maintenance, upgradability
- Usable products
  - Simple User Interfaces … Customised User Interfaces
- Value for money
  - Cost of ownership
- Strong reliable partner…
GNSS Hardware – “Future Proofing”

<table>
<thead>
<tr>
<th>1998</th>
<th>1999</th>
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CRS1000:
GPS: C1, P2

RS500:
GPS: C1, P2
What can manufacturers do to further assist with CORS infrastructure?

Respond to Requests For Information in order for you to put together a feasible operating CORS.

- Will provide detailed advice on what needs to be considered.
  - Monumentation, Communication, Power
  - Business Models

Some key points to consider...

- GNSS Antennas should rarely be changed. Get antennas that are able to track all planned Satellite Signals now.
- Examine the upgrade path of GNSS Receivers to ensure they are upwards compatible with tracking appropriate Satellite Signals WHEN you need them.
- Get the GNSS receiver to log native RINEX on the sensor and FTP push to central archive store directly. Allows for greater manufacturer interoperability at the Central Server
- Reliable, Robust Communication system
- Set up front conditions that when Central Software has additional sites added there is a single fee, not manufacturer independent.
  - ...
# Communications

- Software informs user of problems
- User needs to understand the message and act appropriately
The “Higgins” Model

Specify

Specify System
• Target Density, Coverage, Accuracy, Reliability and Availability
• Site Quality
• Equipment Quality
• Geodetic Reference Frame
• Data Services Produced
• Data Access Policy

Stations

Own Stations
• Site Selection
• Site Construction
• Equipment Purchasing
• Station Data Comms
• Site Maintenance
• Equipment Replacement Cycle

Network

Network the Data
• Data Comms from Network Stations
• Control Centre
• Quality Control of Raw Data
• Data Archive

Process

Process Network
• Copy of Network
• Data Processing
• Production of Data Streams
• Data Wholesaling
• Retailer Support

Deliver

Deliver Service
• Retail Sale of Data Products
• Marketing
• Rover Equipment Support
• End User Support
• Liaison with User Comms Providers

Governance

Courtesy of M.Higgins, DERM, QLD, Australia
The “Higgins” Model

Specify

- AuScope Geospatial Committee for Science Issues
  - Primarily by Federal, State and Territory Governments Responsible For Geodesy (via ICSM)

Stations

- Geoscience Australia’s’ ARGN Stations
- AuScope funded Stations
- AuScope matched Stations
- State/Territory Government Non-AuScope Stations

Network

- Geoscience Australia Gathers data from the unified National network
- Suitable Stations
- State/Territory Government Sub-Networks

Process

- Single Station Raw Data Post or Real Time
- Geoscience Australia processes data from the unified network

Deliver

- Geoscience Australia Delivers to Science Users
- Static Data for Datum and AusPOS online post-processing

Commercial Partners

- Merge non-Government stations with unified Government network and process the combined network to create value added services

User needs

- Input from User Groups

Non-Government Stations

Governance – Joint Ventures overseen by ICSM

Courtesy of M.Higgins, DERM, QLD, Australia
Work Smart
Choose Leica SmartNet
Providing operational services

Managing Day-Day operations of a CORS Network through provision of Internet based GNSS Products:

- Monitoring of CORS Data Streams
- Real Time Streaming (RTCM) of Single Base and Network RTK services via NTRIP
- Providing RINEX download service and Coordinate computation through RINEX upload
- Sharing in the user generated revenue to owners and operators of infrastructure

SmartNet UK has been operational from Jan 2006 (10.5 years)
SmartNet AUS operational since Nov 2010 (6 years)
CORS Project References

Regional
Indonesia : BIG (Bakosurtanal & BPN)
Philippines : NAMRIA
Malaysia : JUPEM
Thailand : DPTC. MET Dept
Australia : Various
New Zealand : Various
CORS Project References

Regional

916 Sites Managed with Leica Spider Suite of Software

Jenoba in Japan

600/1300 Sites
CORS Project References

Europe

<table>
<thead>
<tr>
<th>Country</th>
<th>Sites</th>
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<td>UK</td>
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</table>
CORS Project References
Americas

>1,100 Sites
36 US States
8 Canadian Provinces

...Mexico coming soon
Thank you