

# CelPlan Engineering Solutions



- Providing solutions to the wireless industry since 1992
- Employee owned
- 500+ employees
- Leader in 3G / 4G designs and solutions
- Innovative software applications and value added consultancy.
- Published technical experience and methodologies
- Highly experienced staff
- Hundreds of implemented designs
- Headquarters in Reston, VA, USA
- Other global offices in North America, South America, Europe, Africa and Middle East

## Your Single Source for Wireless Engineering, Consulting, Training and Technology Transfer

### Multi Country Presence

Fully functional subsidiaries in:

- ◆ USA
- ◆ Brazil
- ◆ Argentina
- ◆ Chile
- ◆ Uruguay
- ◆ Peru
- ◆ Colombia
- ◆ Mexico

### Independent

- ◆ Employee owned company
- ◆ No connection to vendors

### Service Off-loading

- ◆ Off-load of service peaks

### Outsourcing Model

- ◆ CelPlan does all required service

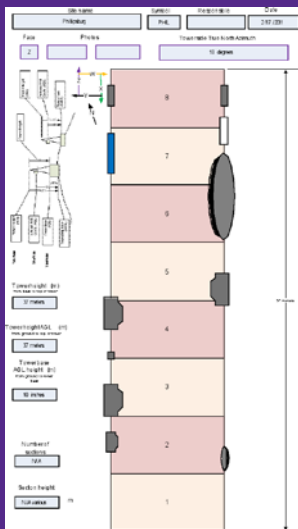
### Development of in-house team

- ◆ Mentoring
- ◆ Management Consulting
- ◆ Technology transfer

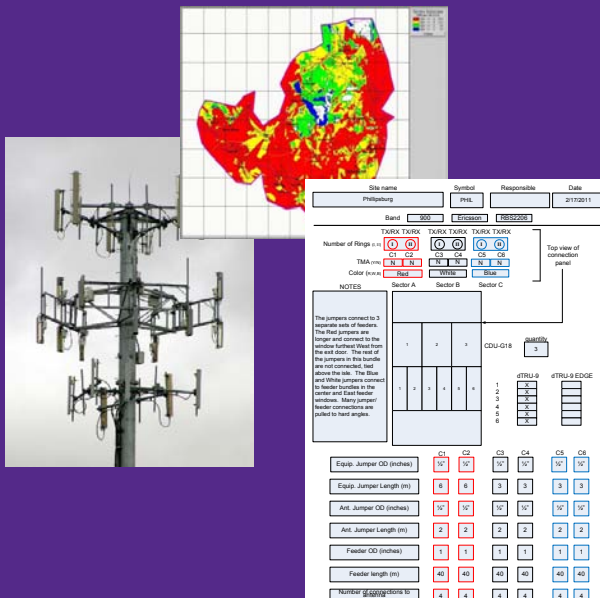


*CelPlan has rapidly established itself as an innovative leader in providing the most advanced engineering solutions for the wireless industry. CelPlan brings a powerful and sophisticated portfolio of engineering capabilities to bear on the design and development of 3G and 4G networks*

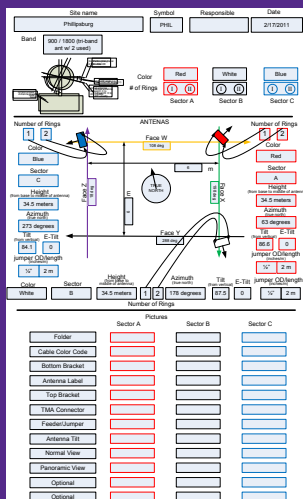
## Technical Site Survey



## Drive Testing



## Network Optimization



INDEPENDENCE

WORLDWIDE PROJECTS

## Professional Services

### Technical Site Survey (TSS)

- ◆ Documentation of existing installations
- ◆ Audit of existing installations
- ◆ Analysis and proposal for expansions
- ◆ Tower and equipment room survey
- ◆ CelDoc allows access documentation from web
- ◆ Cable and connectors testing (distance to fault and VSWR)
- ◆ Interference measurement at antenna port

### Drive Testing (DT)

- ◆ Spectrum Scanning
- ◆ Call performance (short and long)
- ◆ Multi-technology
- ◆ Fading measurements
- ◆ Indoor loss characterization
- ◆ Multi floor building loss

### Phone Compatibility Test (PCT)

- ◆ Stationary call placement
- ◆ In movement call performance
- ◆ Issues analysis and recommendations

### Network Optimization

- ◆ Footprint optimization
- ◆ Frequency planning
- ◆ Performance Analysis
- ◆ Statistics analysis
- ◆ Parameter Optimization

### Tast Execution (TE)

- ◆ Specialized man power
- ◆ Multi-disciplinary capability

### Project Management (PM)

- ◆ Deployment management
- ◆ Vendor coordination
- ◆ Network acceptance

# Consulting

## Green Field Operations Support

- ◆ Business Case Preparation
  - ◆ Market Analysis
  - ◆ CAPEX/ OPEX/ ROI
- ◆ Market Studies
  - ◆ Market survey
- ◆ RFI/RFP Preparation
  - ◆ RFP base design
  - ◆ Bid preparation
  - ◆ Question replies
- ◆ Equipment/Vendor Selection
  - ◆ Proposal Analysis
  - ◆ Negotiations support

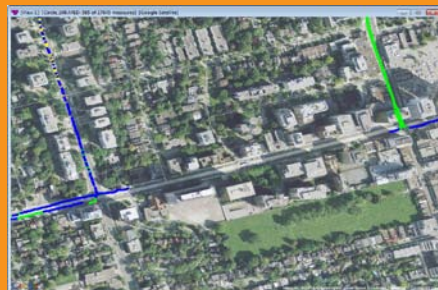
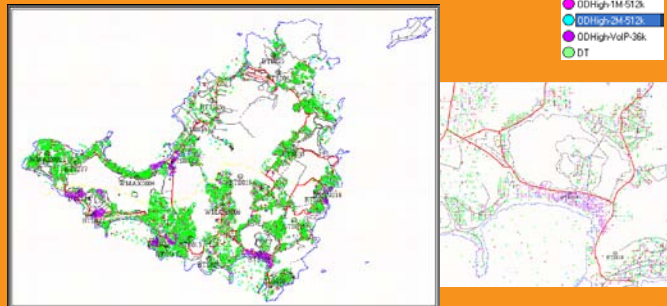
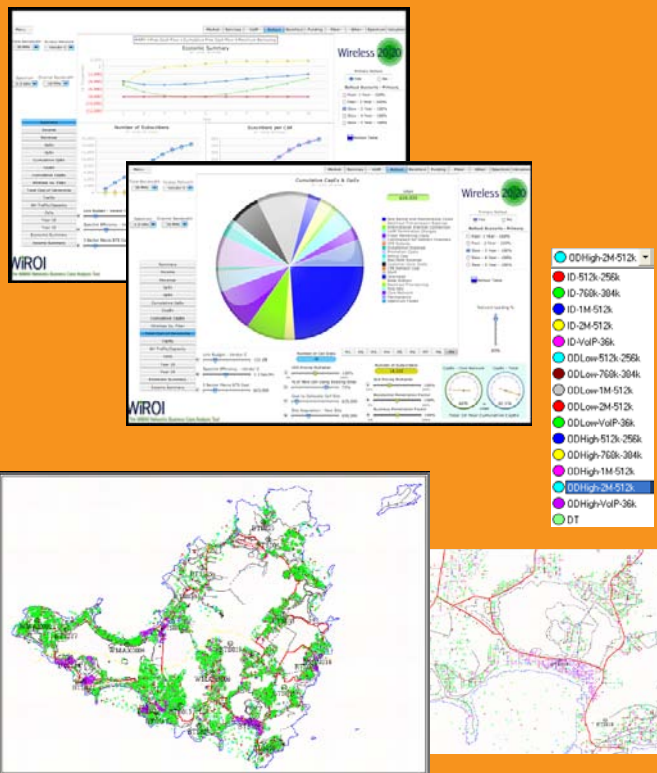
## Network Operation Support

- ◆ Network Design
  - ◆ Traffic demand analysis
  - ◆ Site location/ configuration
  - ◆ RF propagation prediction
  - ◆ Propagation model calibration
- ◆ Network Optimization
  - ◆ Neighborhood Optimization
  - ◆ Handover Optimization
  - ◆ Frequency/ Code Assignment
- ◆ Network Studies
  - ◆ Statistics analysis/ recommendations
  - ◆ Parameters optimization
- ◆ Network Audits
  - ◆ Drive Testing
  - ◆ Performance and issue reports
- ◆ RF Interference/Safety
  - ◆ Exposure verification

## Specialized Studies

- ◆ R&D
- ◆ Software Development
- ◆ Enterprise solutions

## Green Field Operations Support



## Network Operation Support

Series Code	Class Name	Pwr. Dens. (dBm)	Path. Exp. (dBm)	Target		Target Ex. (dBm)	Target Ex. (dBm)	Percentage of Excess above Target	Status	Minimum Thresholds Achieved in Percentage of		Average Thresholds Achieved in Percentage of
				Min	Max					Min	Max	
02	Consumer Data 910-910 at 10m height	84	84	100%	100%	100%	100%	100%	OK	100%	100%	100%
03	Consumer Data 1070-1070 at 10m height	209	84	100%	100%	100%	100%	100%	OK	100%	100%	100%
04	Consumer Data 1120-1120 at 10m height	312	120	100%	100%	100%	100%	100%	OK	100%	100%	100%
05	Consumer Data 1302-1302 at 10m height	1,024	208	100%	100%	100%	100%	100%	OK	100%	100%	100%
06	Consumer Data 201-1120 at 10m height	2,048	312	100%	100%	100%	100%	100%	OK	100%	100%	100%
07	Consumer Data 910-910 at 27m height	84	84	100%	100%	100%	100%	100%	OK	100%	100%	100%
08	Consumer Data 1070-1070 at 27m height	209	84	100%	100%	100%	100%	100%	OK	100%	100%	100%
09	Consumer Data 1120-1120 at 27m height	312	120	100%	100%	100%	100%	100%	OK	100%	100%	100%
10	Consumer Data 1302-1302 at 27m height	1,024	208	100%	100%	100%	100%	100%	OK	100%	100%	100%
11	Consumer Data 201-1120 at 27m height	2,048	312	100%	100%	100%	100%	100%	OK	100%	100%	100%
12	Consumer Data 910-910 at 10m height	84	84	100%	100%	100%	100%	100%	OK	100%	100%	100%
13	Consumer Data 1070-1070 at 10m height	209	84	100%	100%	100%	100%	100%	OK	100%	100%	100%
14	Consumer Data 1120-1120 at 10m height	312	120	100%	100%	100%	100%	100%	OK	100%	100%	100%
15	Consumer Data 1302-1302 at 10m height	1,024	208	100%	100%	100%	100%	100%	OK	100%	100%	100%
16	Consumer Data 201-1120 at 10m height	2,048	312	100%	100%	100%	100%	100%	OK	100%	100%	100%
17	Consumer Data 910-910 at 27m height	84	84	100%	100%	100%	100%	100%	OK	100%	100%	100%
18	Consumer Data 1070-1070 at 27m height	209	84	100%	100%	100%	100%	100%	OK	100%	100%	100%
19	Consumer Data 1120-1120 at 27m height	312	120	100%	100%	100%	100%	100%	OK	100%	100%	100%
20	Consumer Data 1302-1302 at 27m height	1,024	208	100%	100%	100%	100%	100%	OK	100%	100%	100%
21	Consumer Data 201-1120 at 27m height	2,048	312	100%	100%	100%	100%	100%	OK	100%	100%	100%



## Training and Technology Transfer



# Training and Technology Transfer

## Technology Training

- ◆ Wireless Basic Principles
- ◆ GSM/GPRS/EDGE
- ◆ Cdma2000/ EVDO
- ◆ WiMAX, LTE, WIFI
- ◆ Wireless Network Design
  - ◆ Prediction and Optimization Tool Training

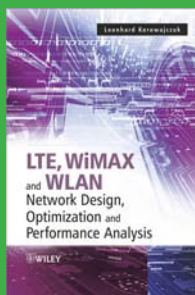
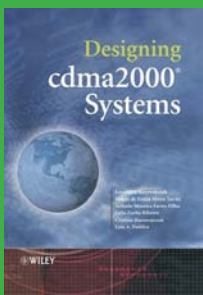
## Mentoring

- ◆ On the job team training
- ◆ Team formation

## High Level Consulting

- ◆ CEO and CTO support
- ◆ Operations audit
- ◆ Board advisory

## Published Books



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