Spectrum Management System for Developing Countries (SMS4DC)

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BDT/PRI/TND

Content of the presentation

- History of SMS4DC
- Main Functions of SMS4DC
  - Administrative Functions
  - Engineering Functions
  - Geographic Map Display functions
- Samples for the different functions
- How to obtain SMS4DC
- New capabilities of the Version 3
- Future developments

History

- ITU-R and ITU-D cooperation
- 1995 BASMS (FoxPro)
- 1997 WinBASMS
- WTDC March 2002: further developments
- 2002 ITU-R SG1: Rec. ITU-R SM.1604
- Consolidated technical specification: 2004
- 2007 first quarter: Version 1
- 2008 first quarter: Version 2
- 2009 third quarter: Version 3

Main Functions of SMS4DC

- Administrative Functions
  - Relational database management,
  - Recording frequency application, frequency assignment, licensing, coordination data, import data from BRIFIC & SRS
  - Producing electronic notices, print license, invoice & spectrum fee
  - Security features: Multi level access enables system administrator to define users and groups with different access levels.

Main Functions of SMS4DC

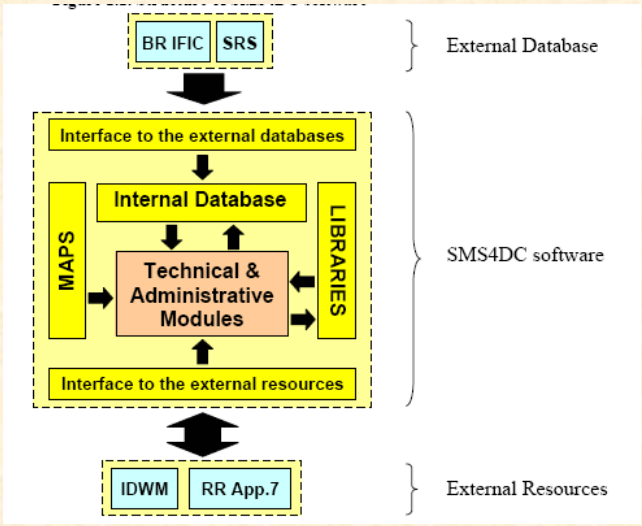
- Engineering Analysis Function
  - Enhanced analysis tools for frequency arrangement, assignment, coordination and interference calculation
    - Propagation models based on ITU-R latest recommendations available at the time of development, i.e. P.1546, P.370, P.530, P.452, P.526, extended HATA models for various service types and P.618-8 for Earth to space total attenuation calculation;
    - Coverage area, field strength, field strength contour, microwave link calculations, network coverage and best server calculation.

Main Functions of SMS4DC

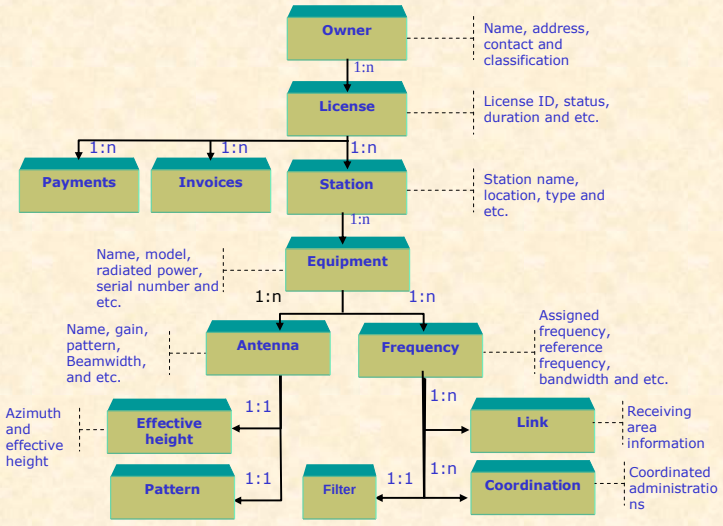
- Geographic Map Display Function

- User friendly interface, displaying of DTM, capability of importing standard mapping formats including Globe map and displaying of geographical maps,
- Online latitude, longitude and altitude presentation, overlaying, Scrolling and Zooming functionality capability of handling vectors,
- Providing multiple entry functions, menu items, assigning new stations on map and searching and displaying a station or group of stations on map.

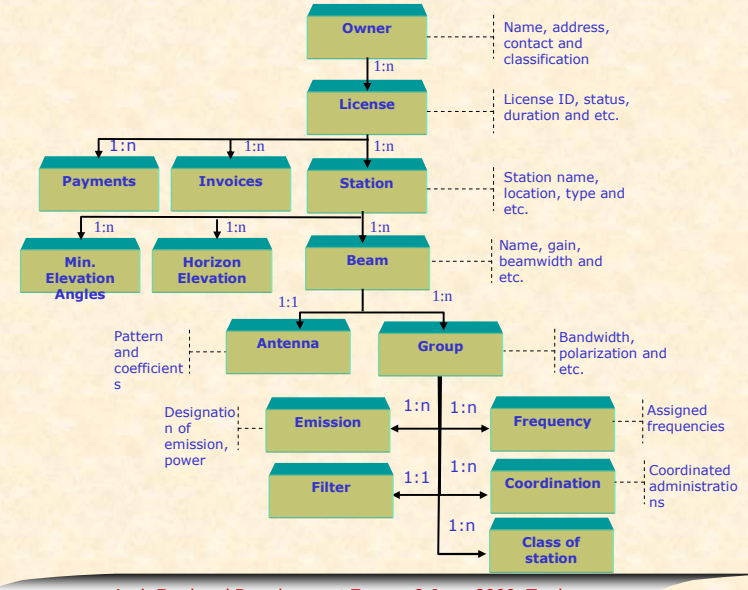
STRUCTURE OF SMS4DC



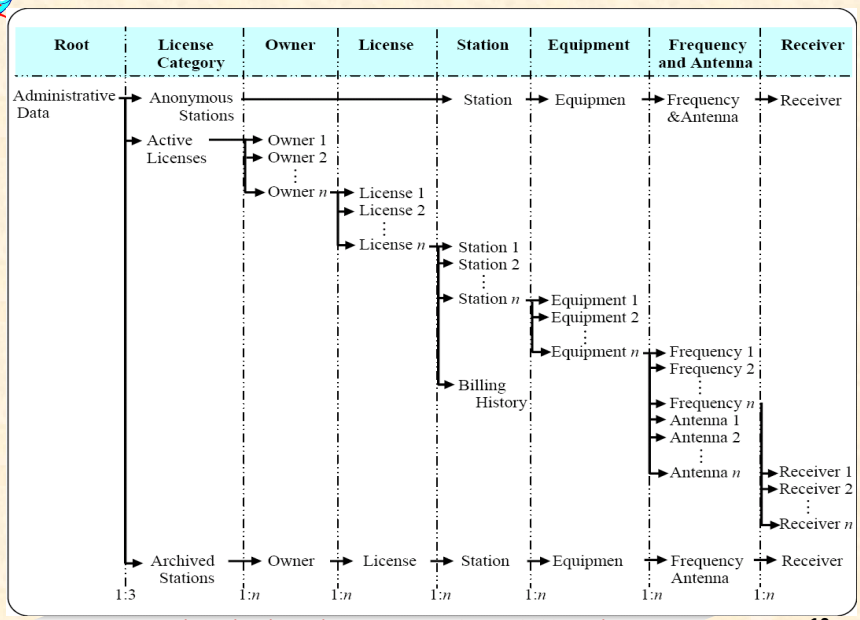
User View of Data (terrestrial)



User View of Data (earth stations)



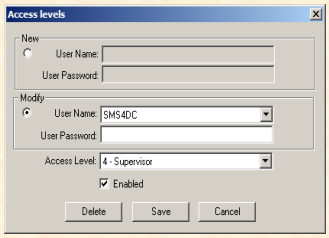
Flow of Administrative Data Entry

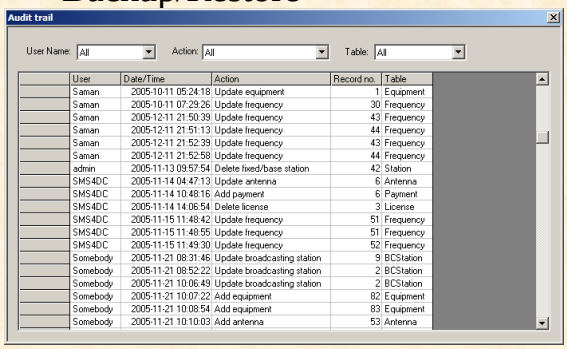


Samples of SMS4DC's Administration Functions

Supervisory tasks

- User access
- Audit control
- Backup/Restore





Samples of SMS4DC's Administration Functions

Data capture screens

Owner information

Modify | Cancel | Save

	Value
Owner Name	Admin2
Owner Address	Enghelab Ave.
City	Tehran
Country	IRN
Telephone	3243541
Telex	
Fax	5123451
Email	x@c.com
Remarks	
Security Category	Y
Address Code	A
Code of Operating Agency	001
Billing	
Billing Name	Admin2
Billing Address	Tehran

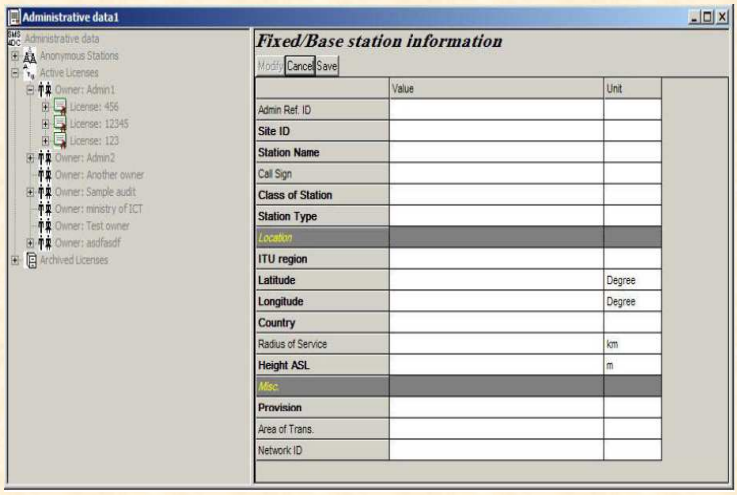
Owner information

Modify | Cancel | Save

	Value
Nom du propriétaire	Admin2
Adresse du propriétaire	Enghelab Ave.
Ville	Tehran
Pays	IRN
Téléphone	3243541
Télex	
Fax	5123451
Email	x@c.com
Remarques	
Niveau de sécurité	Y
Code d'adresse	A
Code de la compagnie exploitante	001
Billing	
Facturation au nom de	Admin2
Adresse de facturation	Tehran

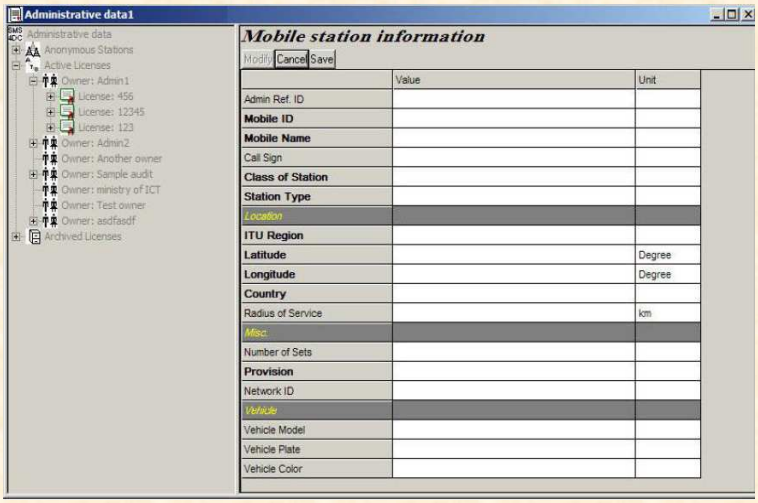
Samples of SMS4DC's Administration Functions

Fixed/Base Station Information
Data Entry Table



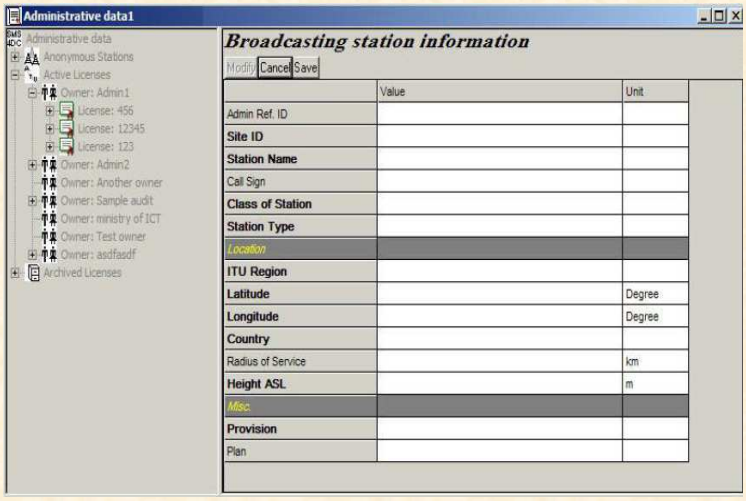
Samples of SMS4DC's Administration Functions

Mobile Station Information
Data Entry Table



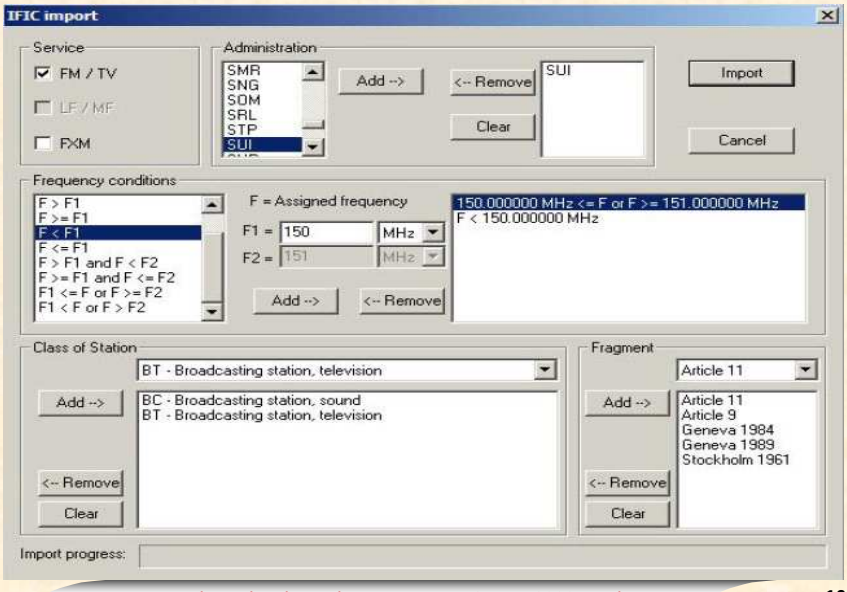
Samples of SMS4DC's Administration Functions

Broadcasting Station Information
Data Entry Table



Samples of SMS4DC's Administration Functions

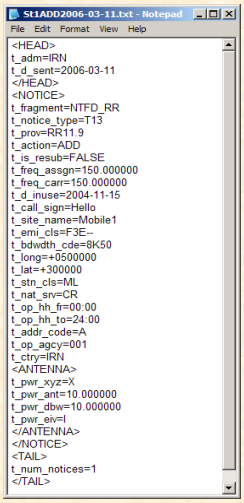
Dialog box for importing data from BRIFIC (Terrestrial)



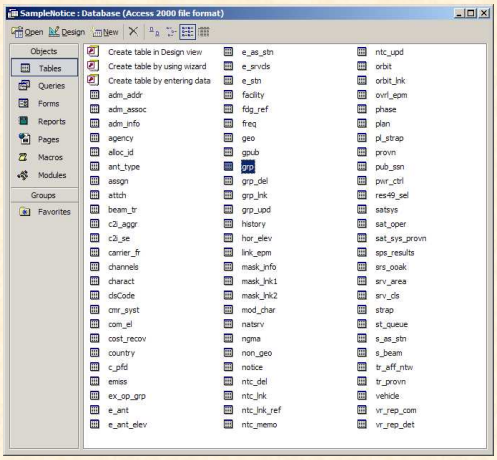
Samples of SMS4DC's Administration Functions

Electronic notices

Fixed, Land mobile, Broadcasting

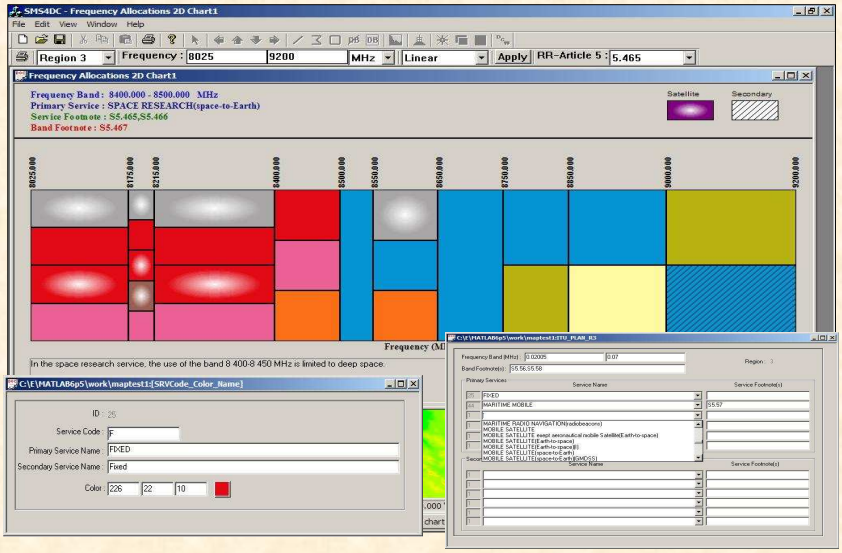


Earth station



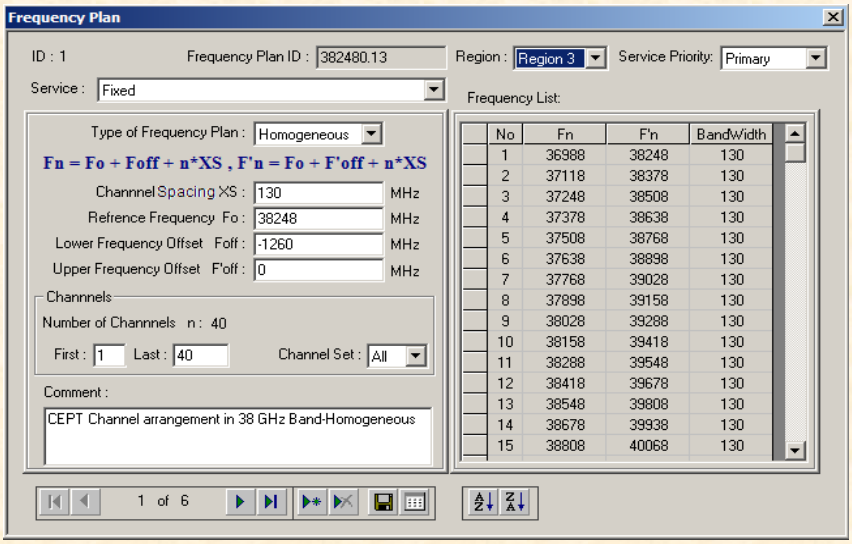
Sample of SMS4DC's Engineering Functions

International & National frequency allocations table (chart)



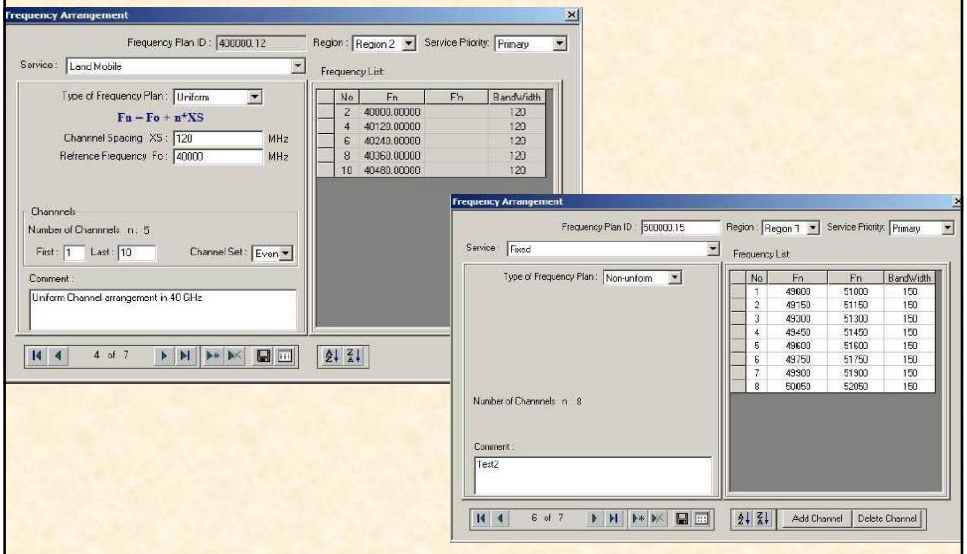
Sample of SMS4DC's Engineering Functions

Frequency arrangement (Homogeneous)



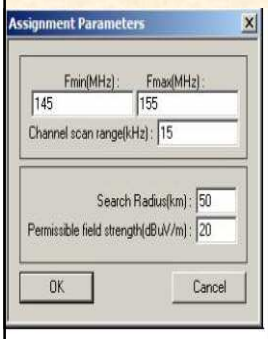
Sample of SMS4DC's Engineering Functions

Frequency arrangement (Uniform & non Uniform)

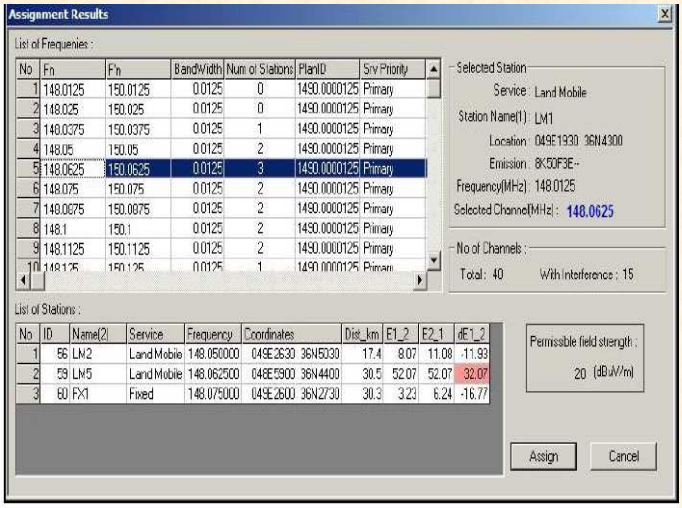


Sample of SMS4DC's Engineering Functions

Frequency assignment parameters & EMC analysis results



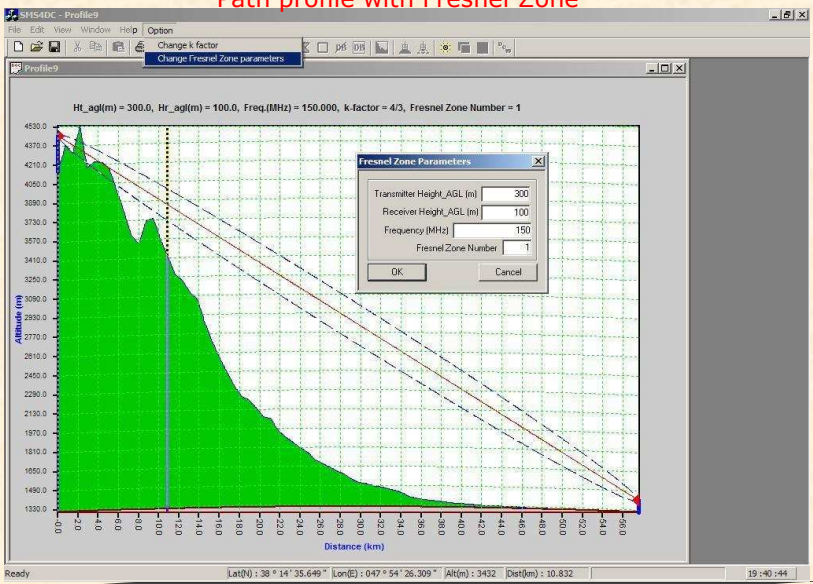
(a) Frequency assignment parameters



(b) EMC analysis result for assigning available planned frequencies to a concerned station

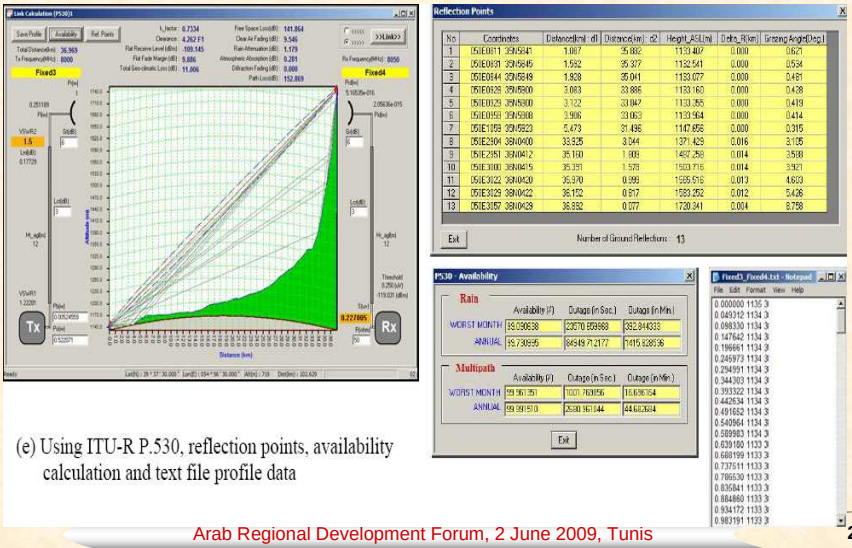
Sample of SMS4DC's Engineering Functions

Path profile with Fresnel Zone



Sample of SMS4DC's Engineering Functions

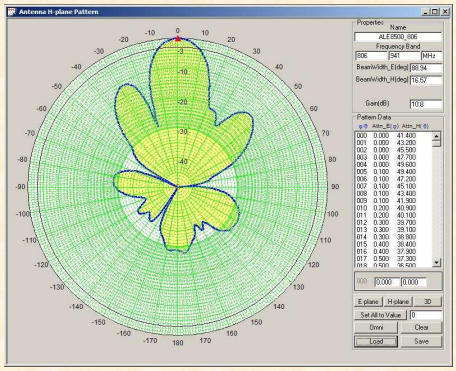
Link Calculation Dialog box using different propagation models

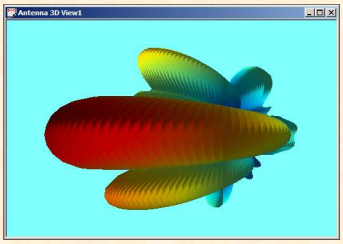


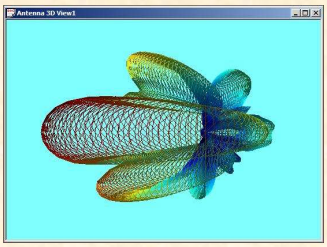
(e) Using ITU-R P.530, reflection points, availability calculation and text file profile data

Sample of SMS4DC's Engineering Functions

The finest grid in "Antenna Editor" dialog box

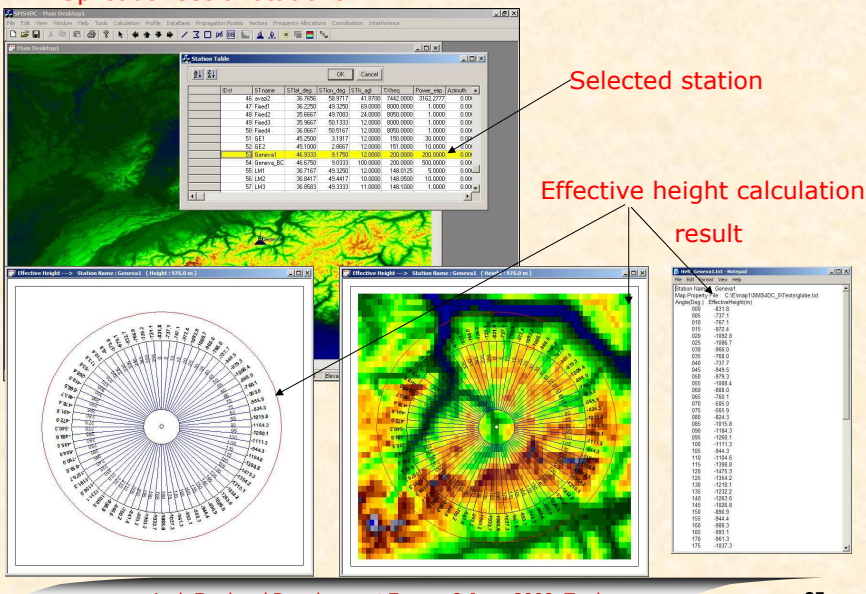






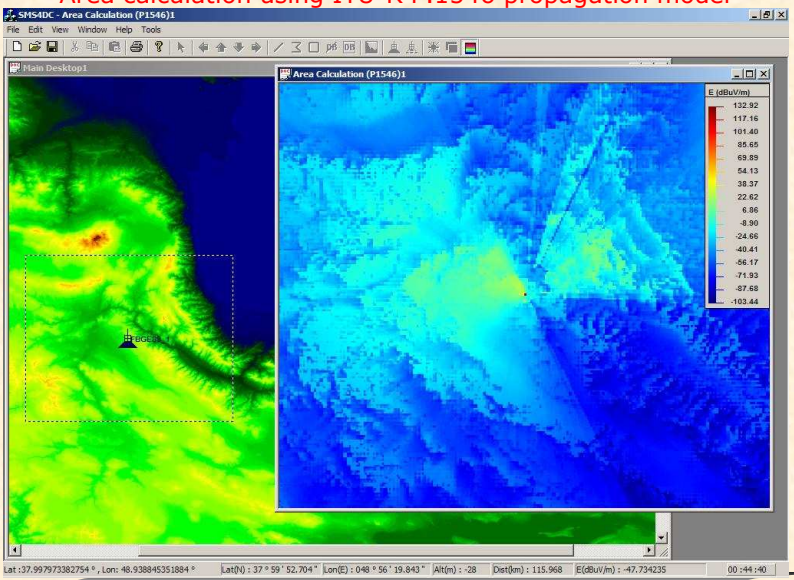
Sample of SMS4DC's Engineering Functions

Spreadsheet of stations



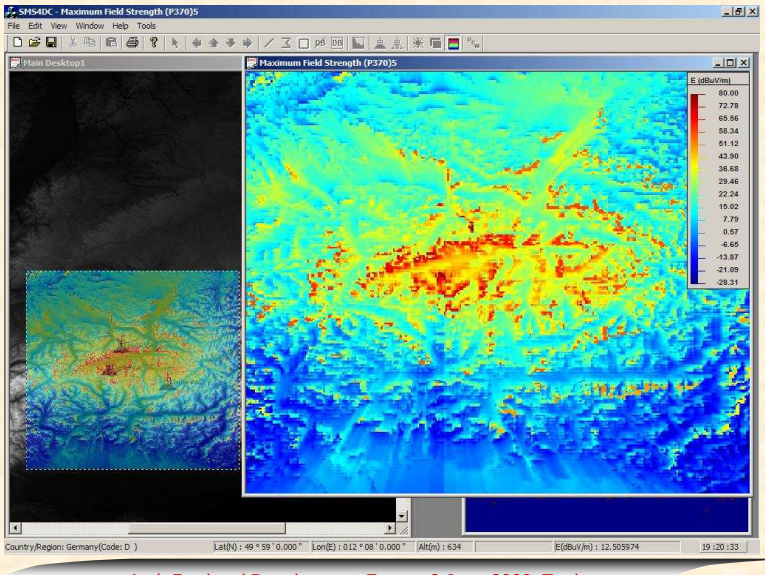
Sample of SMS4DC's Engineering Functions

Area calculation using ITU-R P.1546 propagation model



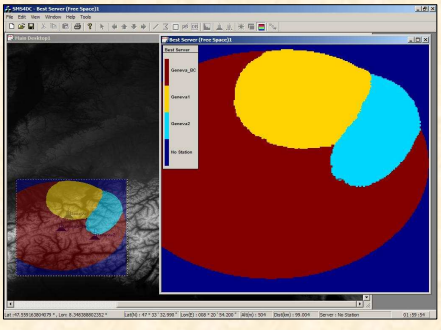
Sample of SMS4DC's Engineering Functions

Network Processor : Maximum Field Strength

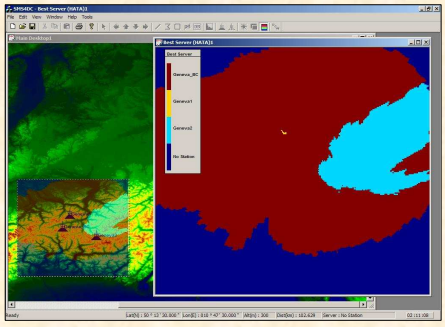


Sample of SMS4DC's Engineering Functions

Network Processor : Best Server



(a) Free-Space propagation model



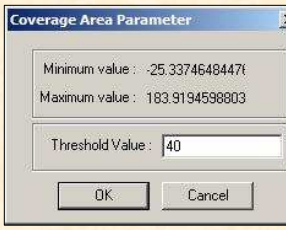
(b) Okumura-Hata propagation model

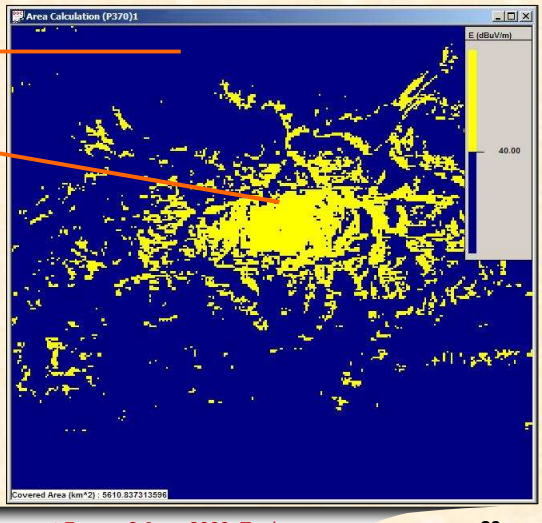
Sample of SMS4DC's Engineering Functions

Coverage Area calculation

E < Threshold Value

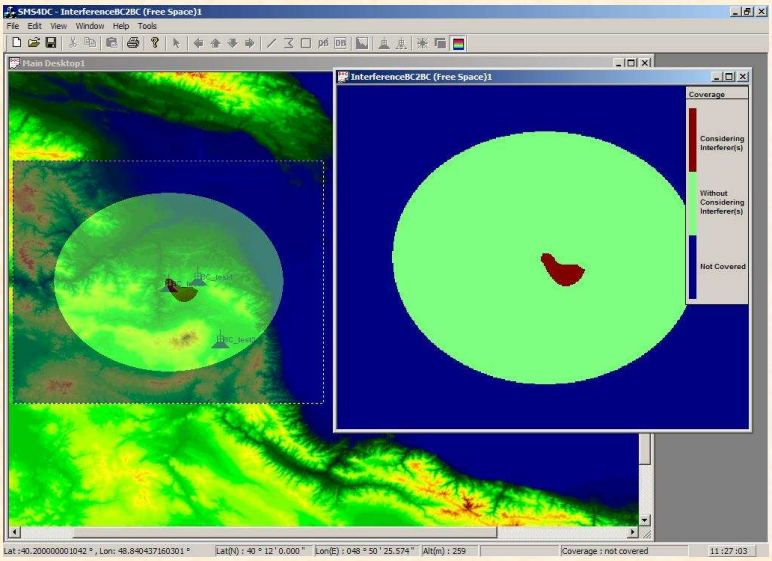
E > Threshold Value





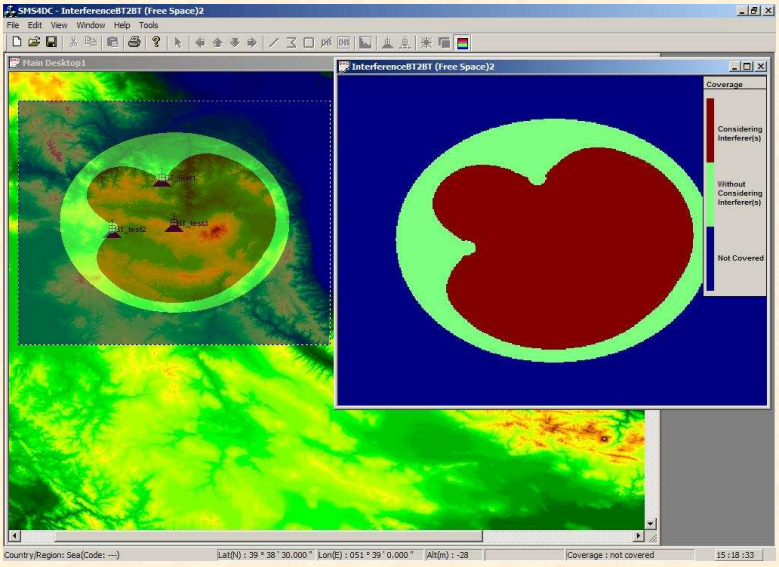
Sample of SMS4DC's Engineering Functions

Interference calculation BC to BC



Sample of SMS4DC's Engineering Functions

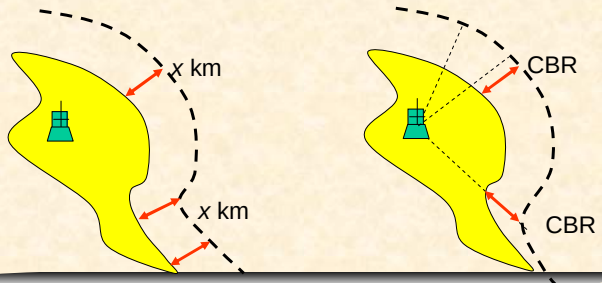
Interference calculation BT to BT



Sample of SMS4DC's Engineering Functions

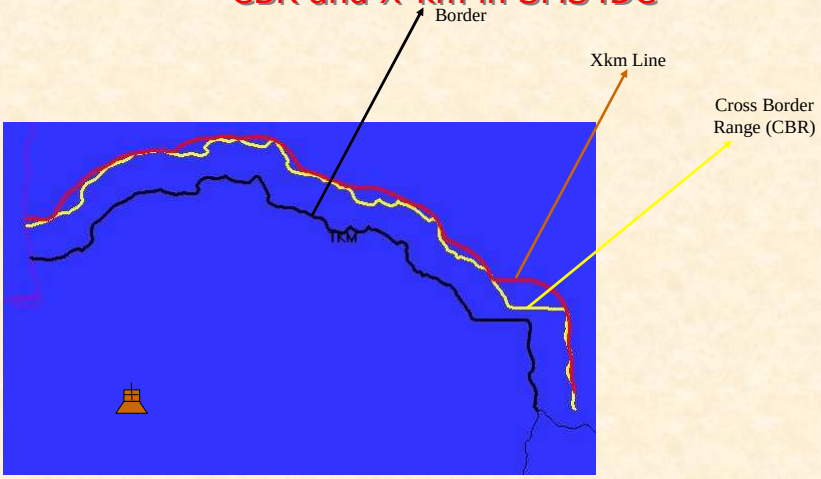
User define agreement
Cross Border Range (CBR) & X-Km

- CBR: Locus of points with identical distance to the border along the line to TX
- X-km: Locus of points with identical distance to the nearest point of border



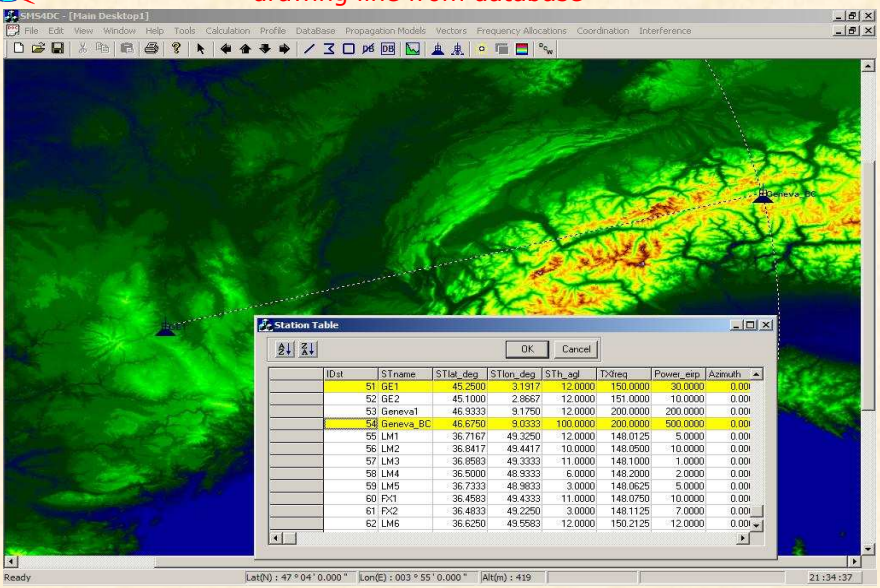
Sample of SMS4DC's Engineering Functions

CBR and X-km in SMS4DC



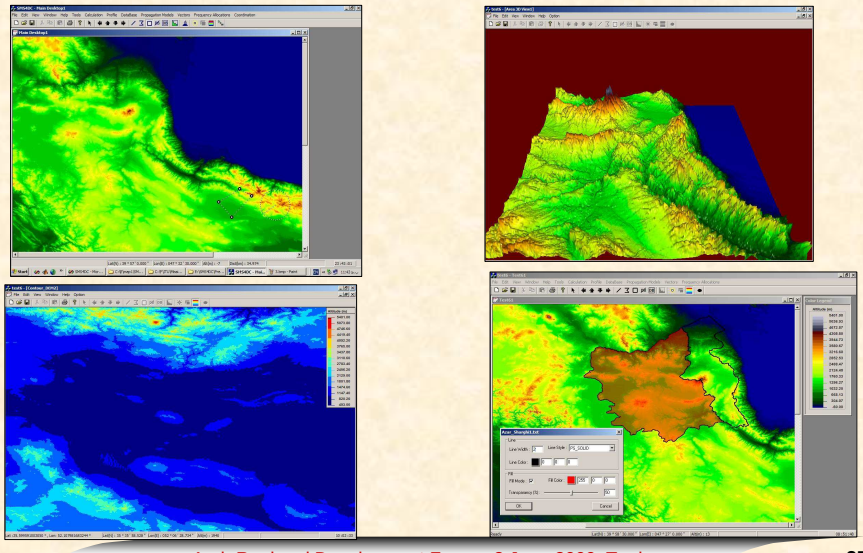
Sample of Geographic Map Display functions

drawing line from database



Sample of Geographic Map Display functions

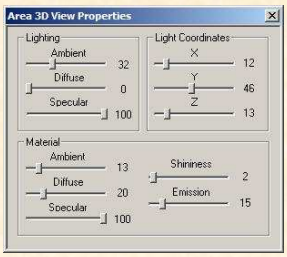
Topographical map of a selected area, relevant 3D view and vector overload

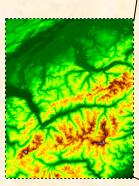


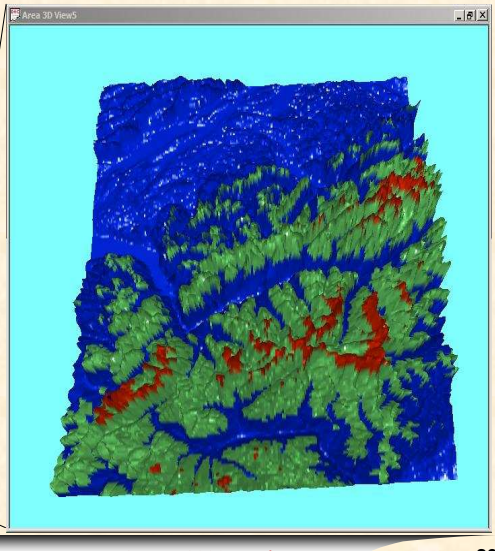
Sample of Geographic Map Display functions

3D view of a selected area

Dialog box to adjust visual effects of 3D view

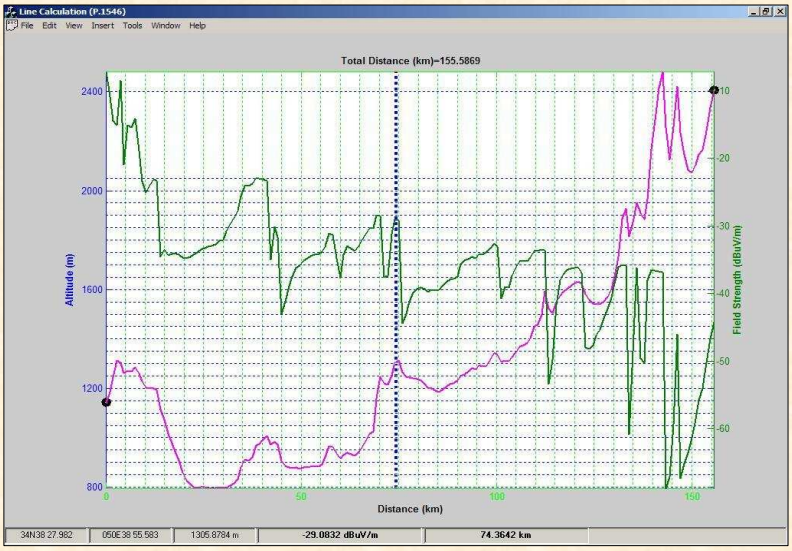


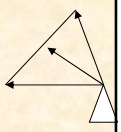




Sample of Geographic Map Display functions

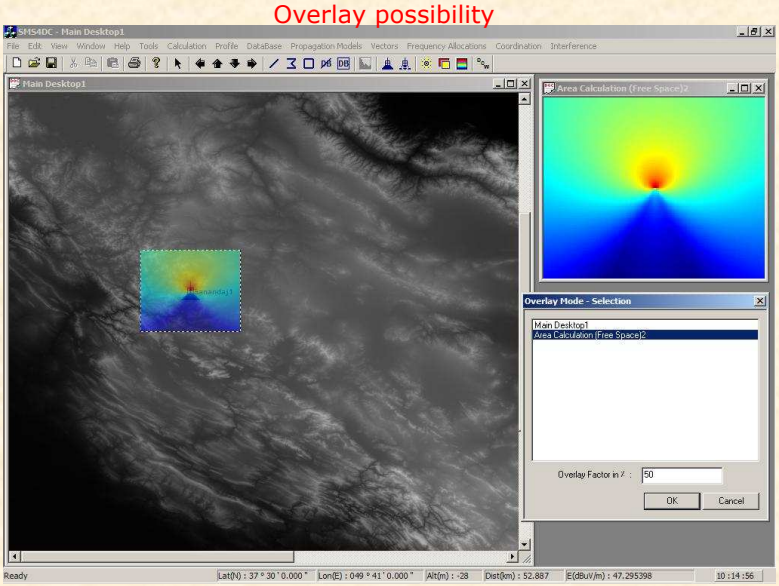
Field Strength along a line





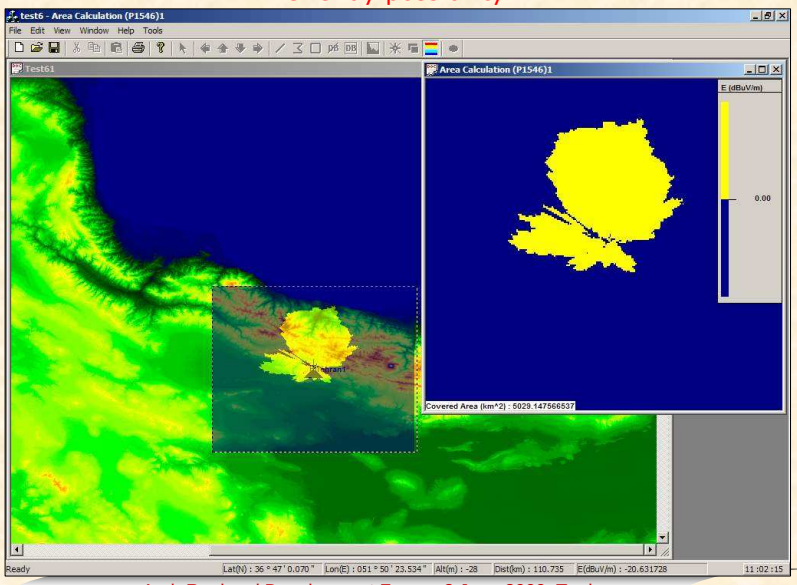
Sample of SMS4DC's Engineering Functions

Overlay possibility



Sample of Geographic Map Display functions

Overlay possibility



GE06
REGIONAL AGREEMENT

- Relating to the planning of the digital terrestrial broadcasting service in Region 1 (parts of Region 1 situated to the west of meridian 170° E and to the north of parallel 40° S, except the territory of Mongolia) and in the Islamic Republic of Iran, in the frequency bands 174-230 MHz and 470-862 MHz

GE06 AGREEMENT CALCULATIONS

Identification of administrations potentially affected by modifications to the Plans in respect to their

- broadcasting service
- other primary terrestrial services
  (limits in Section I of Annex 4)

Identification of administrations potentially affected by modifications to the List

- When an administration proposes to change the characteristics of an *existing assignment to other primary terrestrial services*, or to bring into use a new assignment to *other primary terrestrial services* shall seek the agreement of any other administration whose broadcasting service is considered to be affected.

GE06 AGREEMENT CALCULATIONS

Coverage and service area calculation

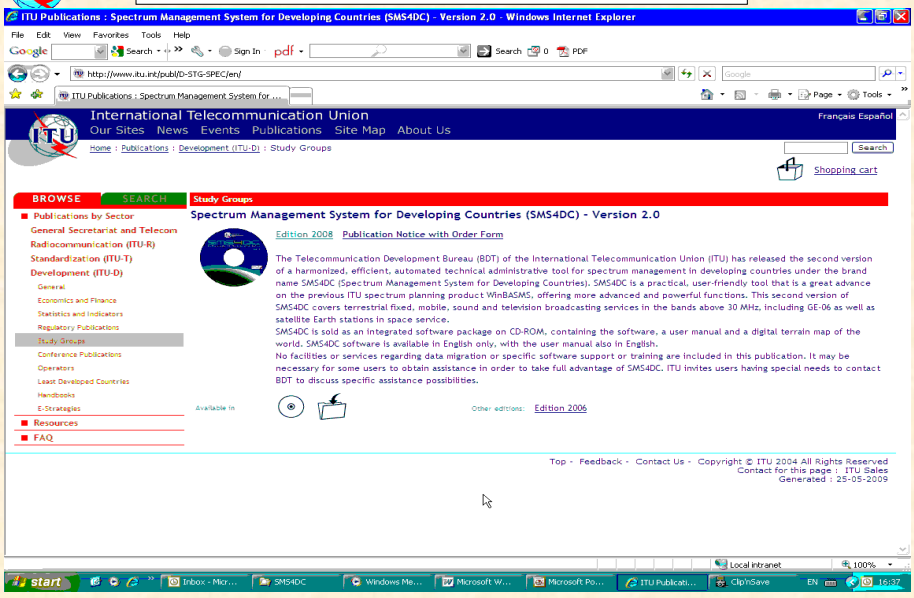
Stage 1 – Calculation of noise-limited coverage area
Stage 2 – Identification of interferers
Stage 3 – Calculation of the test points for the interference-limited coverage

Calculation of interference caused by Interferer Station/ Assignment/Allotment to Victim Stations/Assignments/ Allotments

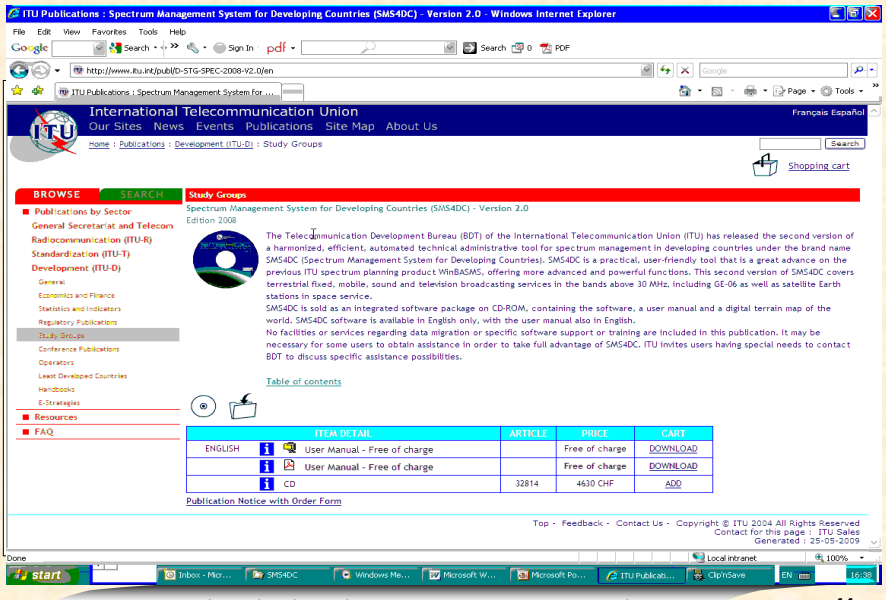
- BCBT to Digital BCBT or to Analogue BT;
- FXM to Digital BCBT or to Analogue BT;
- BCBT to FXM

Official results from the BR !

http://www.itu.int/publ/D-STG-SPEC/en/



http://www.itu.int/publ/D-STG-SPEC-2008-V2.0/en



Annual licensing fee

Annual licensing fee in Swiss francs:

Catalogue Price (software) annual licensing fee: CHF **4,410.–**
(for a single workstation)

Member State Administrations and Sector Members: –15%
Administrations of the Least Developed Countries: – 80%
Libraries of educational institutions: – 80%

Price for software installed on one single or multiple workstation(s)

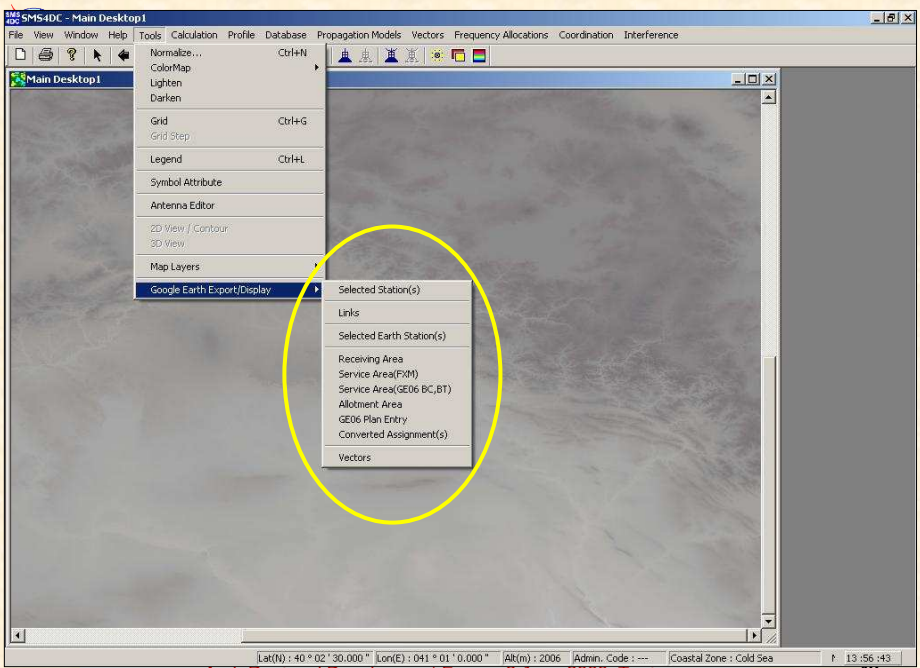
Number of workstations*	1 ☐	2-3 ☐	4-5 ☐	6-10 ☐
Annual licensing fee (in Swiss francs)	**4 410.–**	**6 615.–**	**7 497.–**	**8 820.–**

* *Please tick the appropriate box*

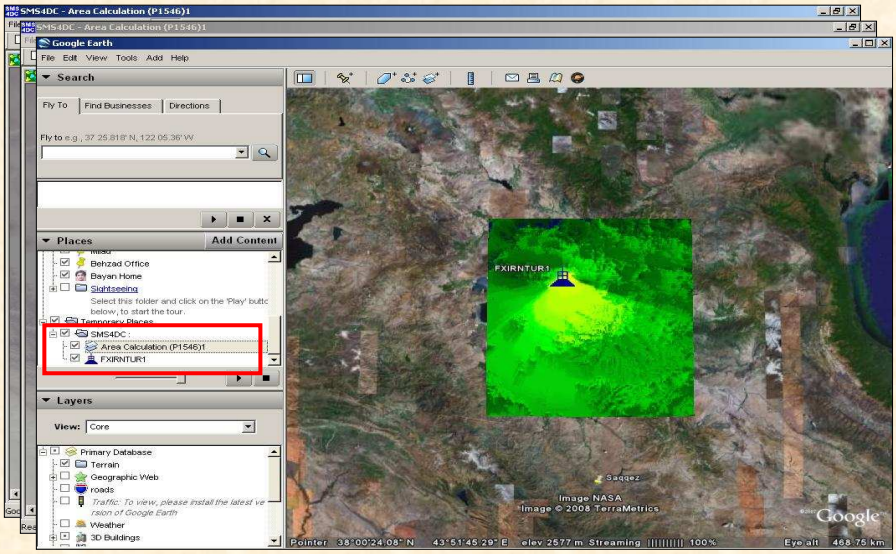
SMS4DC version 3.0
New/Modified Capabilities

GoogleEarth Export

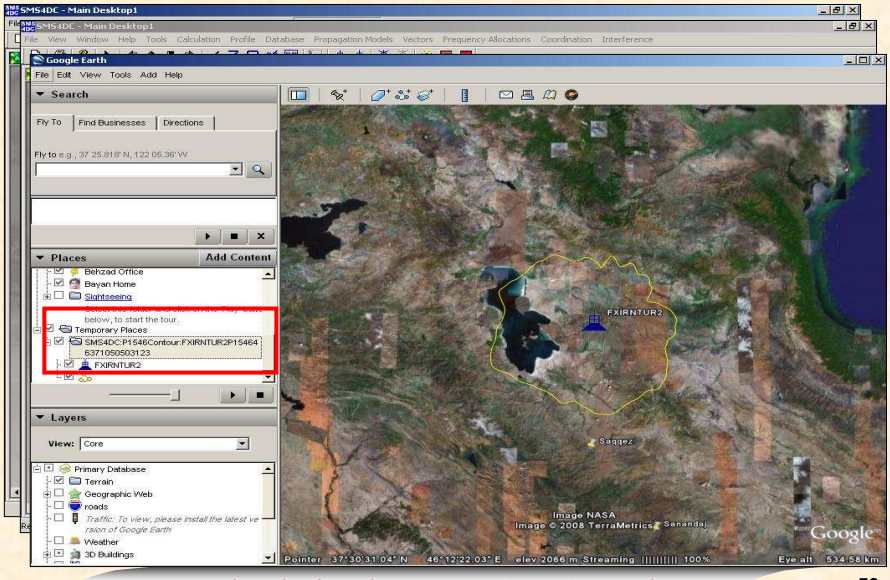
- Selected Stations (Including Earth Stations)
- Selected Links
- Receiving Area
- Service Area
- Allotment Area
- GE06 Plan Entry
- Converted Assignments
- Vectors
- Area Propagation Calculation (Free Space, Line of Sight, Former P.370, P.1546, Okumura-Hata), Maximum Field Strength Calculation, Best Server Calculation, Field Strength Contour
- GE06



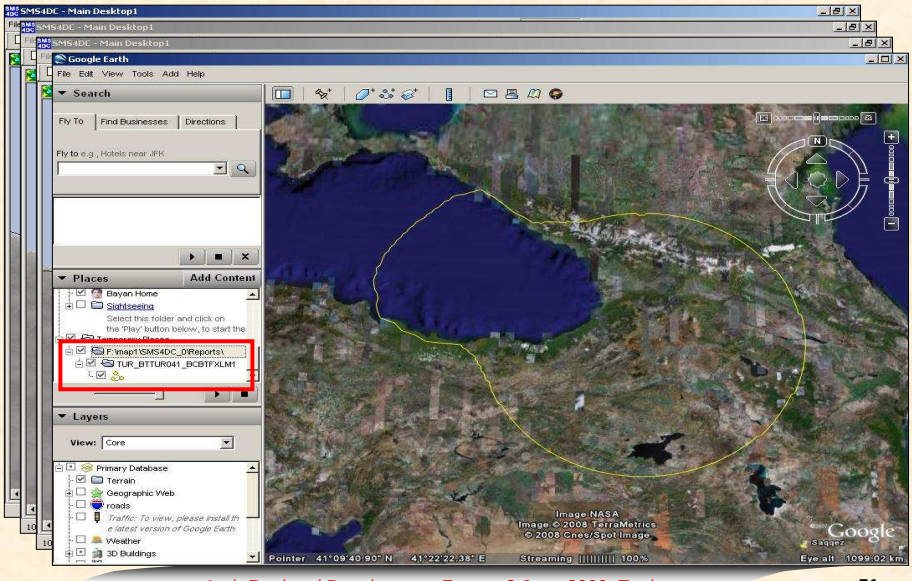
Area Calculation (P.1546)



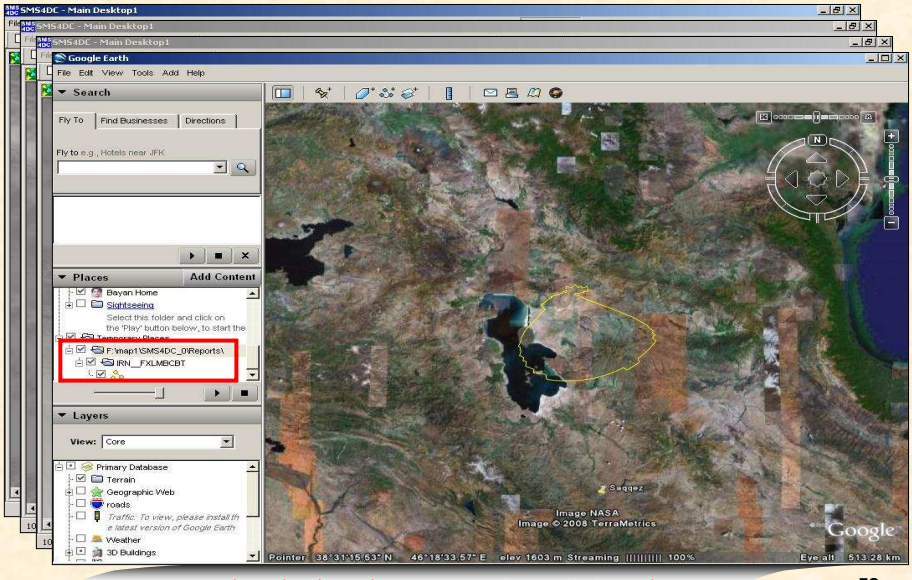
Field Strength Contour(P.1546)



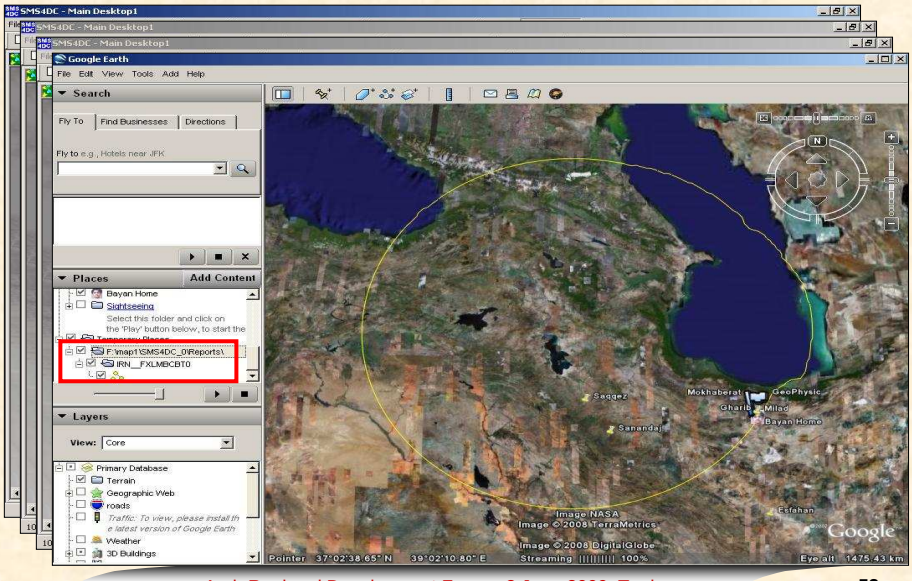
GE06 (BCBT2FXLM)



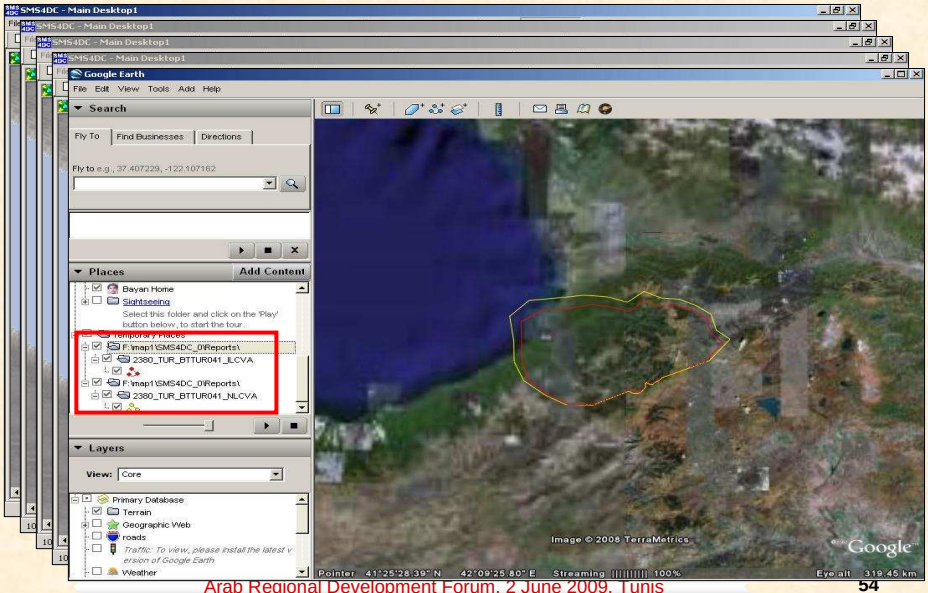
GE06 (FXLM2BCBT_Tx)



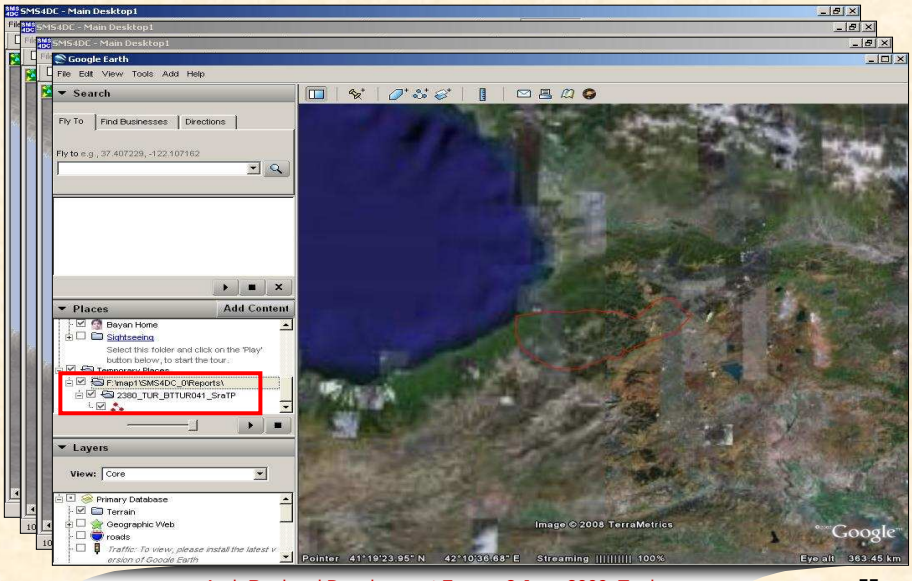
GE06 (FXLM2BCBT_Rx)



GE06 (CoverageArea)



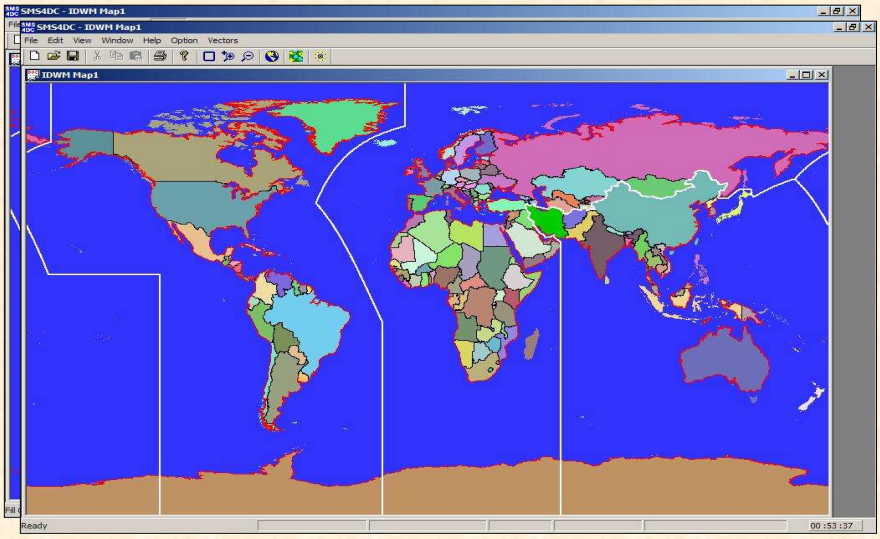
GE06 (SeviceArea)



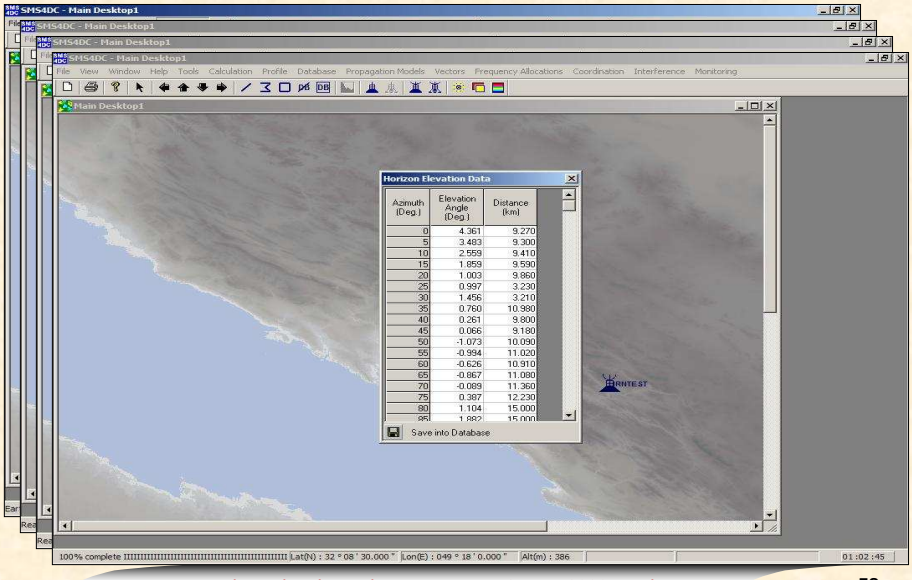
Other Changes/Additions

- Fill countries
- Horizon Elevation Calculation for ES
- Azimuth to GSO Satellite Calculation
- Elevation to GSO Satellite Calculation
- BR-IFIC Import

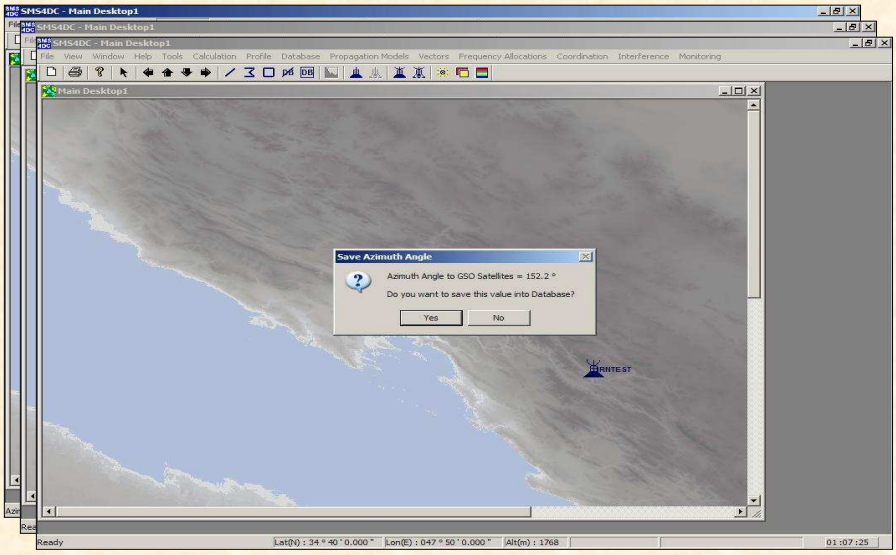
Fill countries



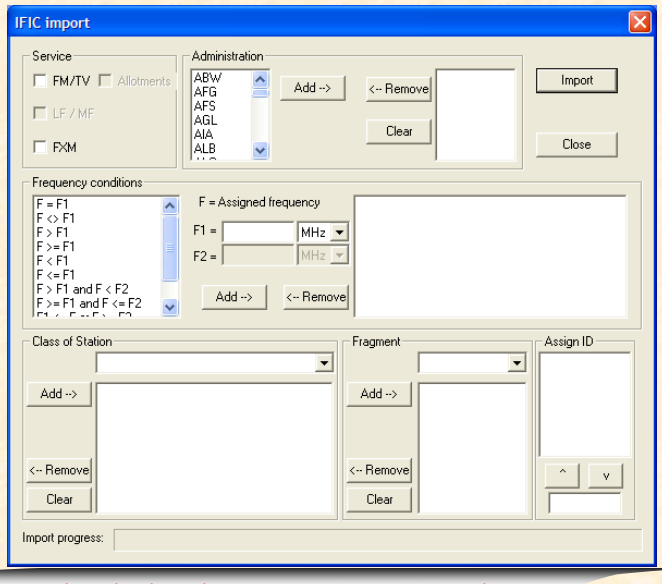
Horizon Elevation Calculation for ES



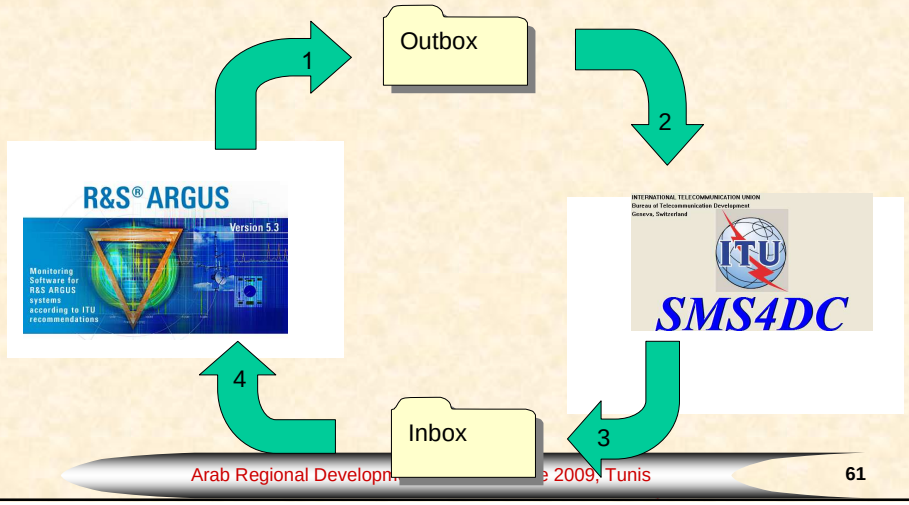
Azimuth to GSO Satellite Calculation



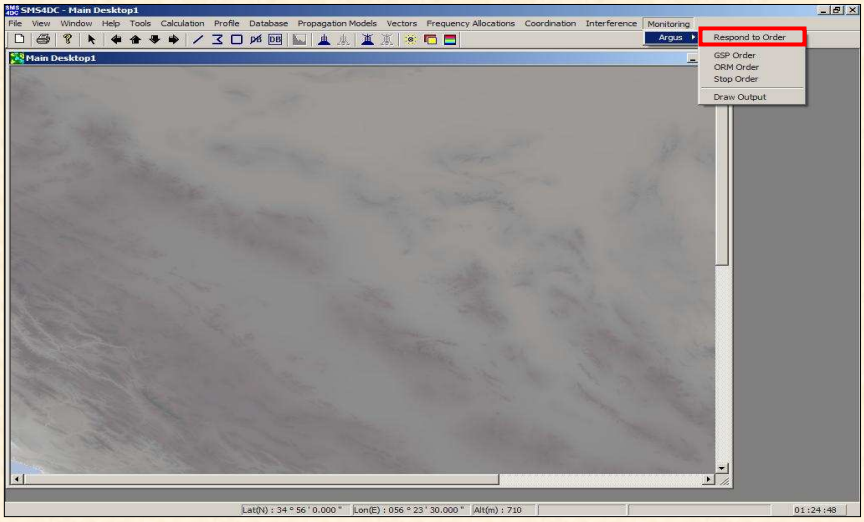
BR-IFIC Import



Spectrum Management Database Interface - SMDI



Argus - SMDI



Order Report Module – ORM – 1

A- Get System Parameters (GSP)

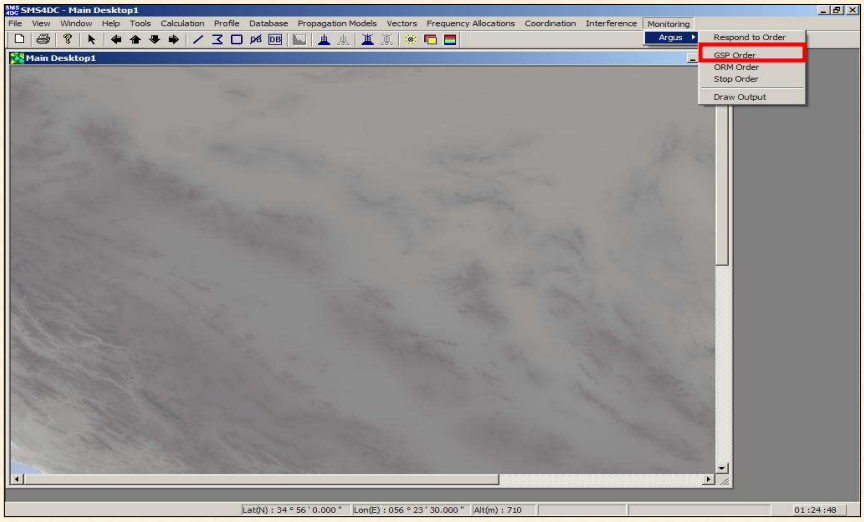
SMS4DC

R&S® ARGUS

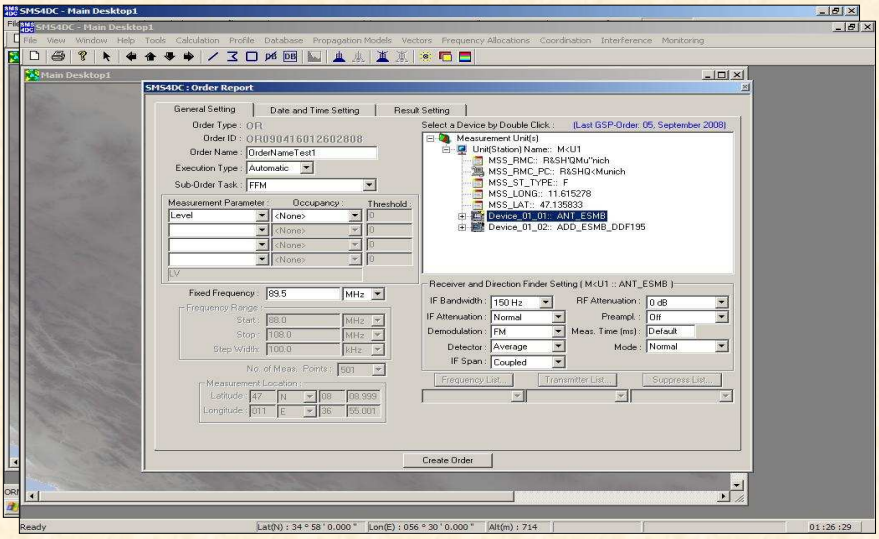
Version 5.3

Monitoring Software for R&S ARGUS systems according to ITU recommendations

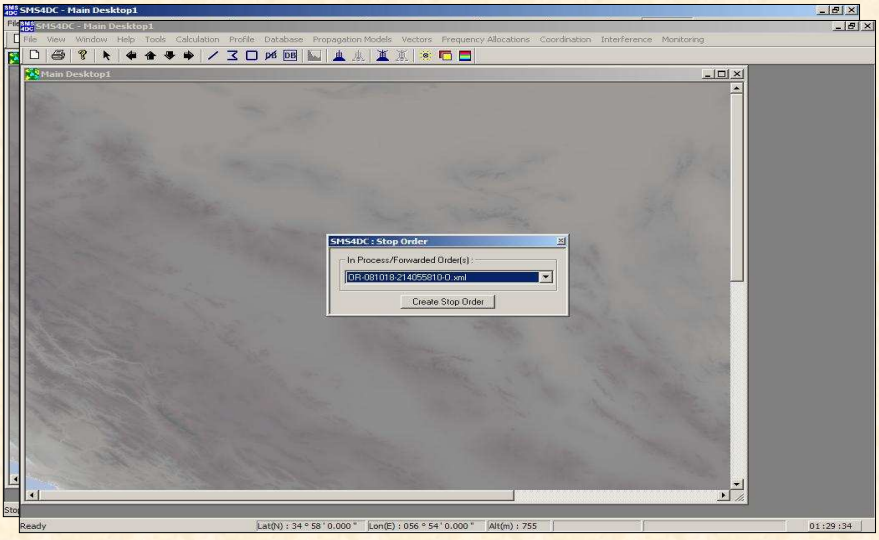
Argus - GSP



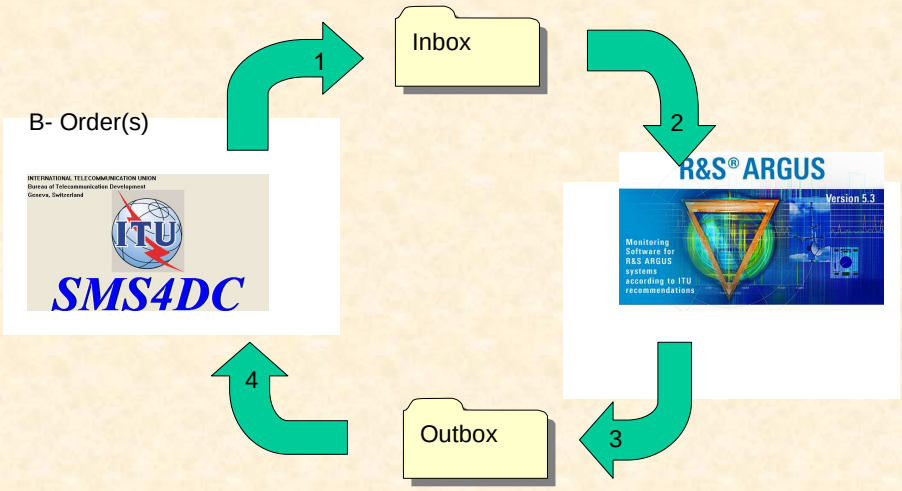
Argus - ORM



Argus – STOP Order

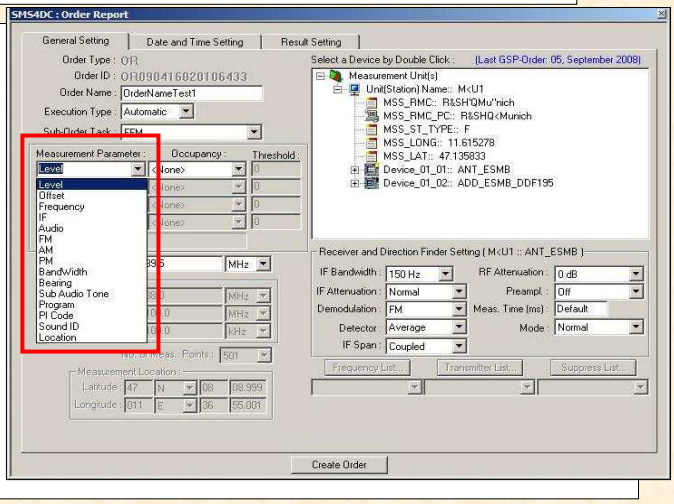


Order Report Module – ORM – 2

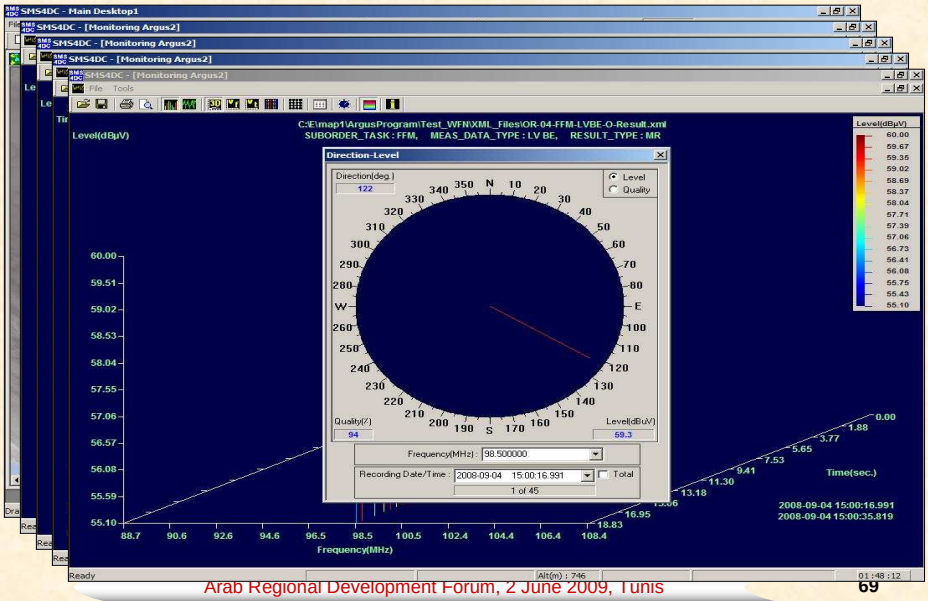


ORM - parameters

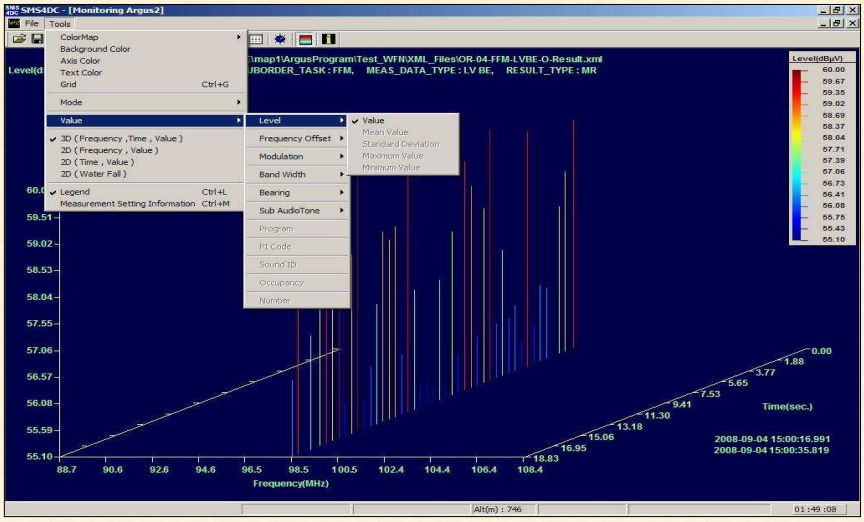
- Level
- Offset
- Frequency
- IF
- Audio
- AM
- FM
- PM
- BandWidth
- Bearing
- Sub Audio Tone
- Program
- PI Code
- Sound ID
- Location



Argus – Draw Output



Argus - parameters



Future developments

- Addition of new services (e.g. radionavigation, maritime mobile)
- Purchase follow-up
- SMS4DC web-site
- On-line training material

Thank you!

istvan.bozsoki@itu.int

http://www.itu.int/ITU-D/tech/spectrum-management/SMS4DC.html

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