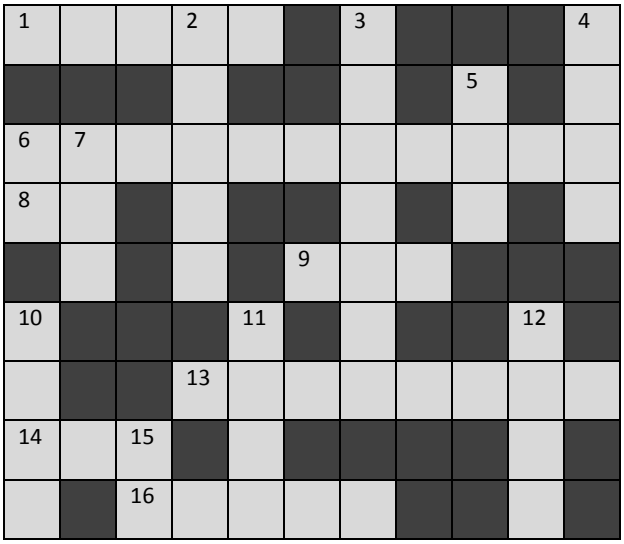
WRC Puzzles Newsletter and Announcing New Book on *Interference Analysis*

Welcome to WRC 2015! To help fill in those gaps between sessions we have prepared a newsletter containing a few puzzles and announcing a book written by Transfinite's John Pahl called "*Interference Analysis: Modelling Radio Systems for Spectrum Management*". This book, due to be published by Wiley in May 2016, is the culmination of nearly 30 years of experience working in the field of interference analysis and will contains over 500 pages and 160 examples.

WRC Crossword Puzzle



Across
1: Keep communications to the point (5)
6: WRC writes lots of these (11)
8: We all hear about it (2)
9. Rocky drink (3)
13: 16 across is in 15 (8)
14: And satellite shall talk to satellite (3)
16: The Titanic needed this (5)

Down
2: Train, boat or plane (5)
3: 5 is especially important (7)
4: Would have spotted the iceberg that hit the Titanic (4)
5: Modifications unnecessary (3)
6: In Varembé, in English (2)
7: We are sailing (3)
10: In case of hurricanes and earthquakes (4)
11: 22.5C.1 (4)
12: You are probably here already (4)
15: 134567 (2)

Geneva Photo Puzzle

1. Where was this photo taken?

   _____

2. To the nearest 10°, what direction is this photo looking?

   _____

Threshold Calculation Puzzle

This puzzle involves the derivation of a PFD threshold to protect satellite ES using the assumptions in the table below. It is based on an example in the book "*Interference Analysis: Modelling Radio Systems for Spectrum Management*" by John Pahl.

First, calculate the receiver noise using Boltzmann's constant k = -228.6 dBW/ (KHz) and:

$$N = 10log_{10}(T_{rx}) + 10log_{10}(B) + k \qquad (1)$$

$$= \_\_\_\_\_ dBW/4kHz$$

Frequency	f_{MHz}	3 400 MHz
RX temperature	*Trx*	100 K
Reference bandwidth	*B*	4 kHz
I/N threshold for 20% of time	*T* (*I/N*, 20%)	-10 dB
Elevation angle (deg)	θ	10°
Gain pattern	*G*(θ)	Rec. ITU-R S.580

Then, calculate the wavelength in metres using the speed of light c = 3e8 m/s and:

$$\lambda = \frac{c}{f} \qquad (2)$$

$$= \_\_\_\_\_ m$$

Next calculate the effective area in dBm^2 of an isotropic antenna using:

$$A_{ISO} = 10log_{10}\left(\frac{\lambda^2}{4\pi}\right) \qquad (3)$$

$$= \_\_\_\_\_ dBm^2$$

The relative gain at the given elevation angle can be calculated assuming it is on the following segment of the pattern in Rec. ITU-R S.580:

$$G(\theta) = 29 - 25log_{10}(\theta) = \qquad (4)$$

$$\_\_\_\_\_ dBi$$

Hence the PFD threshold for 20% of the time can be calculated using:

$$T(PFD, 20\%) = T\left(\frac{I}{N}, 20\%\right) + N - G(\theta) - A_{ISO} \qquad (5)$$

$$= \_\_\_\_\_ dBW/m^2/4\ kHz$$

Interference Analysis

Modelling Radio Systems for Spectrum Management

By John Pahl, Director

Transfinite Systems Ltd

This new book, due to be published by Wiley in May 2016, will contain over 500 pages, 300 figures, 100 tables, 600 equations and 160 examples.

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FOREWORD by Francois Rancy

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Contact us

We can help operators and spectrum managers analyse interference and performance including:

Consultancy Work

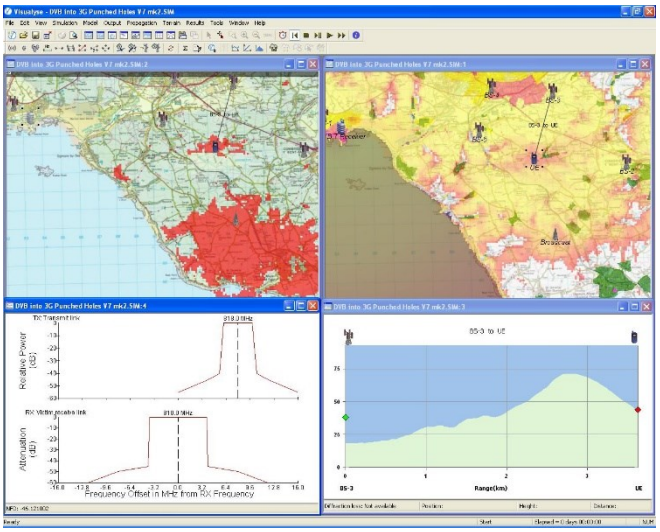
Our consultants can assist you by undertaking:

- Studies of interference analysis, compatibility and methodologies
- Analysis of radiocommunication system's coverage (including mobile networks for regulatory approval)
- Support for satellite co-ordination work, including both GSO and non-GSO
- Link design and radio spectrum planning

Software Products

We have developed a range of radio engineering, spectrum management products including:

Visualyse Professional: the leading "Study Tool" for interference analysis able to model terrestrial and satellite systems using static, dynamic, area or Monte Carlo methodologies.



Visualyse Professional Screenshot

Visualyse GSO

We have developed Visualyse GSO to support satellite coordination tasks, in particular for GSO satellites. It includes IFIC checking, detailed C/I calculations and integrates with ITU databases such as the SRS/IFIC and GIMS. It can be also used to identify coordination requirements of non-GSO satellites.

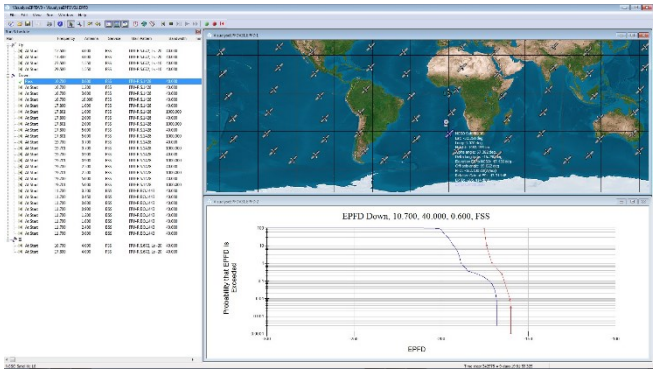
Visualyse EPFD

Our Visualyse EPFD software is the leading implementation of the algorithm in Rec. ITU-R S.1503. It has been verified during testing with the ITU BR and can calculate:

- EPFD(up)
- EPFD(down)
- EPFD(IS)

It can also analyse both the Article 22 and Articles 9.7A and 9.7B cases.

It is available in two versions, one the ITU's "black-box" for pass/fail decisions and the other a product with graphical user interface that provides feedback on the calculation process and allows additional options to be modified.



Visualyse Spectrum Manager: a "next generation" web based licensing portal providing workflow and technical analysis.

Visualyse Coordinate: designed to support the coordination of satellite ES

Regulatory Support

We can provide a range of services to support regulatory activities including licensing and representation at international and regional meetings (e.g. ITU and CEPT).

We can also provide training services in our products and radio engineering.

Feedback

If you have any questions or comments about this White Paper or would like more information please do not hesitate to contact us at:

Email: info@transfinite.com

Email us at info@transfinite.com for further information or to give your views on this White Paper