
Transfinite Systems Ltd

Company Capability



INTRODUCTION

Transfinite Systems Ltd is one of the leading consultancy and simulation software companies in the field of radio communications.

Transfinite consultants specialise in:

- Interference and spectrum sharing analysis
- Frequency co-ordination
- Regulatory advice and representation
- Support for spectrum management activities
- Technical training.

Operators and regulatory authorities throughout the world have used our expertise to develop new regulations, improve spectrum management, help protect existing services, facilitate the introduction of new systems, and to gain operating licences.

AREAS OF EXPERTISE

Study Work

Transfinite has extensive experience of study work for a wide range of clients, carrying out analysis of compatibility between satellite and terrestrial systems on topics such as:

- interference and spectrum sharing analysis
- assessing the impact of proposed regulations
- system compatibility
- frequency co-ordination

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We have determined the potential for systems to suffer or generate interference, compared the impact of alternative architectures, and derived innovative mechanisms to enable sharing.

Studies have been used to support our clients in their activities at meetings of recognised bodies such as the ITU-R or during coordinations. Transfinite consultants have a proven record in study and research work that meets or exceeds client expectation.

Regulatory Advice and Representation

Transfinite staff have a detailed understanding of the regulatory environment in which our clients operate, having actively participated in many meetings of the relevant bodies including



development of regulations.

Our consultants have represented clients at numerous ITU-R and CEPT meetings in recent study cycles. Transfinite consultants have chaired meetings and drafting groups to ensure that work is progressed to the satisfaction of our clients.

Transfinite staff have attended a wide range of ITU-R groups, including SGs/WPs 1, 3, 4, 6, 7, 8, and 9, as well as CPMs and WRCs. We also have attended many CEPT SE, FM, and PT groups and national groups such as UK SGs. We have an in-depth knowledge of their working methods, study methodologies, and procedures, and we have a network of key contacts we can tap into.

We have a detailed understanding of national regulatory issues – for example providing advice to a member of the UK Joint Select Committee reviewing the progress of the Communication Bill and contributing to the Consultation on Spectrum Trading.

Spectrum Management and Engineering



We have a client base that is world-wide, and covers a wide range of services and systems. Providing technical support for Visualyse products gives Transfinite staff a deep and broad understanding of the key issues for today's spectrum managers.

We have a detailed understanding of the new techniques emerging for managing the radio spectrum – interference temperature, convergence, auctioning, secondary trading, change of use, UWB, MIMO, common or unlicensed bands, adaptive systems and so forth.

This understanding of different regulatory regimes, new concepts in spectrum management, new technologies, systems, sharing scenarios and study methodologies can be brought to bear on the tasks identified by our clients.

Visualyse Products



As developers of the worlds leading range of radio communication and interference study tools, we have a complete understanding of their workings and potential.

We can use this experience to build complex simulations quickly and efficiently, allowing us to perform sharing studies and analysis of a wide range of communications systems.

We can provide you with “**Quick Sim**” services, to kick-start your studies by rapidly generating baseline simulation files.

The Visualyse product range includes:

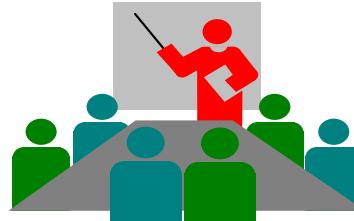
- **Visualyse Professional** – the most widely used “Study Tool” for interference analysis
- **Visualyse GSO** – power and usability to support the coordination of GSO satellites

- **Visualyse Coordinate** – generate coordination contours and undertake detailed coordination of Earth Stations with terrestrial services
- **Visualyse Spectrum Manager** – web based solution to manage blocks of spectrum for National Regulatory Authorities (NRAs) or commercial spectrum management organisations

Technical Training

We can provide technical training in subjects relating to spectrum management and also in use of the Visualyse Product range.

These can be provided either at our offices or on site, to maximise flexibility.



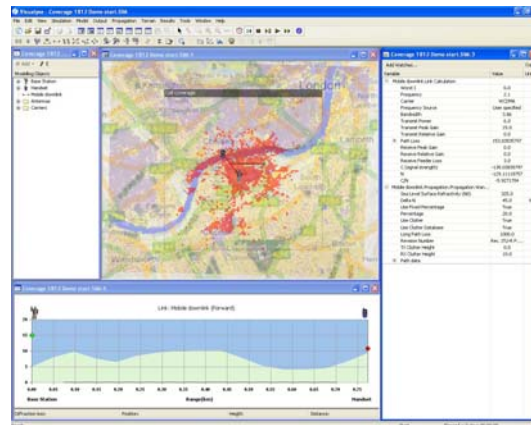
EXPERIENCE IN SYSTEMS AND SERVICES

One of the strengths of Transfinite is the wide range of experience of our staff. We have detailed understanding of both terrestrial and satellite systems that allows us to quickly understand our client's needs and rapidly generate solutions.

Terrestrial Systems

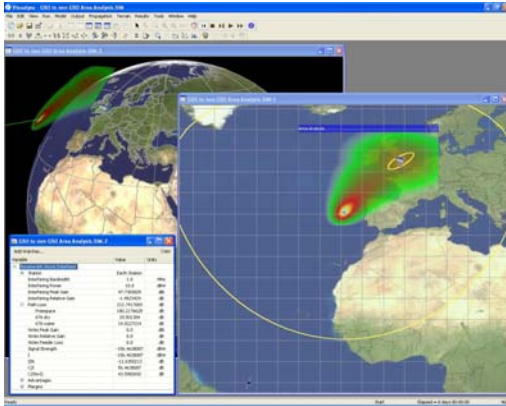
We have studied a wide range of terrestrial systems, from frequencies of around 150 MHz to nearly 50 GHz.

We have worked with Fixed Service systems that are both point-point systems (including line of sight and troposcatter) and point-multipoint, such as Broadband Fixed Wireless Access, and also multi-point to multi-point or Mesh systems.



We have studied mobile systems including GSM, Business Radio and 3G. We have compared IMT-2000 system architectures, and analysed the impact of interference from base stations or handsets, including out of band emissions into sensitive services.

We have analysed interference from unlicensed devices, such as WLANs / Wifi / RLANS and specific standards such as 802.11x and Bluetooth.



Satellite Systems

We have extensive experience of satellite systems, both GSO and non-GSO at frequencies from 150 MHz to 40 GHz.

Transfinite consultants and associates have extensive experience in coordination of GSO satellites, and have access to the Visualyse GSO tool that allows us to support our clients activities in the coordination of their satellite or manage the entire coordination process.

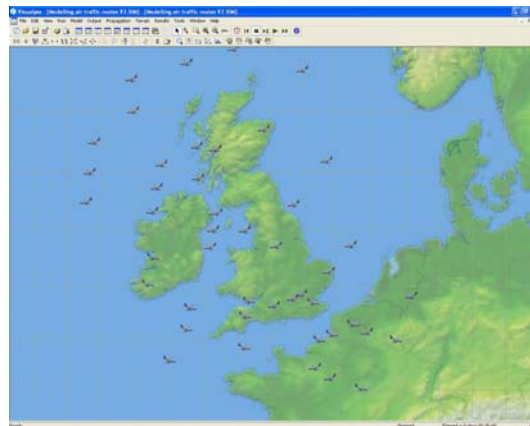
We worked extensively with a non-GSO MSS operator during their design and regulatory approval stages, and have an in-depth understanding of issues relating to non-GSO MSS, and have a similar understanding of non-GSO FSS.

We have also undertaken sharing analysis with space science and navigation systems and have experience of earth station coordination for both GSO and non-GSO systems.

Maritime, Airborne, and other Systems

Transfinite also has experience in undertaking sharing studies between maritime services, airborne services and other services including satellite and terrestrial

This includes systems such as the proposed Connexion system, Microwave Landing Systems, and radar systems such as radiolocation and wind profilers.



We also have experience in other services, such as Space Science, Radio Astronomy, Earth Exploration, ... and almost all those in the Table of Allocations of the ITU-R Radio Regulations.

EXAMPLE STUDIES

Transfinite have a successful track record of previous consultancy studies for clients that include Ofcom / Radiocommunications Agency, Alcatel, New Skies Satellites, Qualcomm Wireless Business Solutions, ICO Global Communications, Inmarsat, Intelsat, Boeing Space Systems, and Comsat.

An example of the range of Transfinite's expertise can be shown from the list of topics that Transfinite have addressed for one particular client, Ofcom (and previously for the Radiocommunications Agency):

- Analysis of methods of defining Spectrum Usage Rights (SURs) in a way to allow flexibility while protecting licensees from interference

- Series of studies to determine the feasibility of sharing the band 14.0 - 14.5 GHz between the Fixed Service and the Aeronautical Mobile Satellite Service
- Study of how to evaluate spectrum occupancy and efficiency for systems operating in licensed-exempt allocations including the 2.4 GHz band
- Inputs to the consultations on Spectrum Trading and the Radio Spectrum Management Review
- Series of studies of sharing between satellite and terrestrial IMT-2000 systems including between HEO broadcast satellite service and IMT-2000 systems
- A study to compare potential architectures for IMT-2000 infrastructure
- A study to assess sharing between the Fixed Service and other services at 32 GHz
- A series of studies sharing the 43 GHz band between Radio Astronomy Service and Multimedia Broadband Fixed Wireless Access (BFWA) systems
- A series of studies of interference between multiple non-GSO systems and GSO FSS systems

CONSULTANT PROFILES

The lead consultants of Transfinite are John Pahl and John Parker.

JOHN PAHL

John Pahl has a Masters in Mathematics from Cambridge University and over 20 years experience in the radio communications industry. Between 1986 and 1994, John worked for Logica in their space systems division, and then in 1994 John founded Transfinite Systems Ltd.

At Transfinite he was a founding Director and responsibilities have included all aspects of company management. He was the original designer of the company's Visualyse Professional radio interference simulation product.

John has led Transfinite's Consultancy activities, and won work from organisations such as Alcatel, Qualcomm, Ofcom, New Skies Satellites, Boeing Space Systems, and ICO Global Communications. This work has involved:

- Technical analysis, considering topics such as interference analysis, coordination studies, system design, radiowave propagation, spectrum efficiency, and spectrum occupancy
- Knowledge of a wide range of systems and services, from satellite (GSO, non-GSO, and HEO), terrestrial (including IMT-2000, FS, BFWA, WiFi, ENG, and UWB) and others including maritime and aeronautical
- Regulatory issues, including review of the Communications Bill that founded Ofcom, chairing ITU-R groups that developed Recommendations, detailed understanding of working practices of international fora and their instruments including the Radio Regulations
- Management, leading a team and responsible for allocation of resources to projects

JOHN PARKER

John Parker was a founding director of Transfinite Systems in 1994. John has a First Class degree in Astrophysics and a Doctorate in Theoretical Physics. John's Astrophysics degree included specialisations in Radio Astronomy and electromagnetic field theory. His PhD concentrated on aspects of theoretical particle physics.

After graduating he spent 18 months in post doctoral research and 6 months in simulation modelling of nuclear fast reactor cores, before beginning to work in satellite communications in 1990. Between 1990 and 1994, John worked on several projects including DRS, Skynet IV and Inmarsat-P. He also spent a 20 months period working for Eutelsat in Paris. This work mainly concentrated on mathematical modelling and future systems analysis. At Eutelsat the work was carried out within the Spectrum Management Group. Since forming Transfinite, John's work has focussed on interference modelling and analysis, including the development of Visualyse.

John has also developed and delivered training courses for the software and worked on many different problems via our technical support help-lines. John has represented ICO and UK positions within the ITU-R in Study Group 4, Working Party 9D, JRG 8D-9D, and also at the TIA in Washington. John's technical and analytic ability is complemented by his experience in the international arena and ability to present his clients' case clearly and authoritatively.

ASSOCIATES

Transfinite has developed a network of Associate Consultants that provide us with access to the leading experts in the industry. Contact us for more information about the Transfinite Associate Consultant network.

CONTACTS

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