25 Years of Visualyse Professional

Abstract : In November 1995, 25 years ago this month, Visualyse was publicly announced for the first time at a presentation at the Intercontinental Hotel in Geneva during the World Radiocommunication Conference. This Newsletter describes the history of Visualyse, from first conceptions to initial release, the various updates and versions, and finally gives a glimpse of the development plans for this, the leading radiocommunication study tool.

Initial Concept

In 1990, John Parker and John Pahl were working at software house Logica on a number of projects that had a common theme. They involved studies for satellite organisations of their radiocommunication systems, and typically involved 5 months writing software to model their systems and then a few weeks running the tool to get results.

It seemed very inefficient. What was required, we thought, was a tool that had all the features built in so users only had to configure it to model their scenario. Then their time could be spent analysing the problem rather than writing software.

And if there wasn't such a tool available on the market, why shouldn't we write one and sell it? It seemed a good enough idea to resign from Logica and set up Transfinite.

We literally had no idea of the road ahead, in which we'd be selling hundreds of copies and making countless trips to Geneva for ITU meetings.

Version 1.0

The first years were hard. We'd take short term consultancy and software development contracts, and in between frantically write code.

The first release wasn't called Visualyse – that name came later. We developed what we called at the time the Interference Modelling Tool or IMT. Given the work at the ITU on mobile networks it is probably just as well we didn't stick with that name!

It was John Parker who came up with the concept: put "Visual" and "Analyse" together to make "Visualyse".

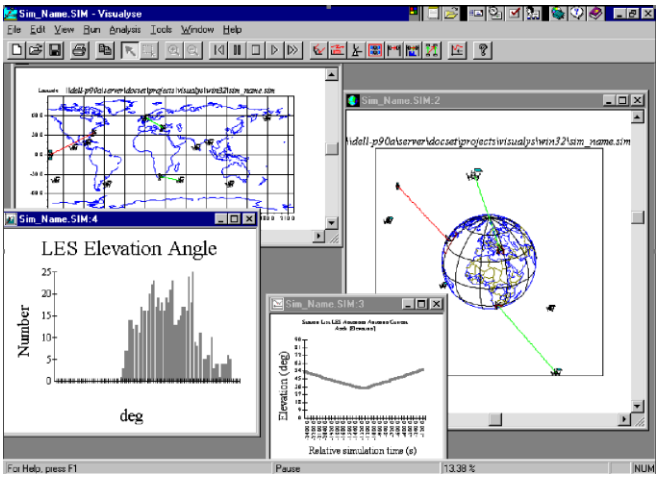
A product was born.

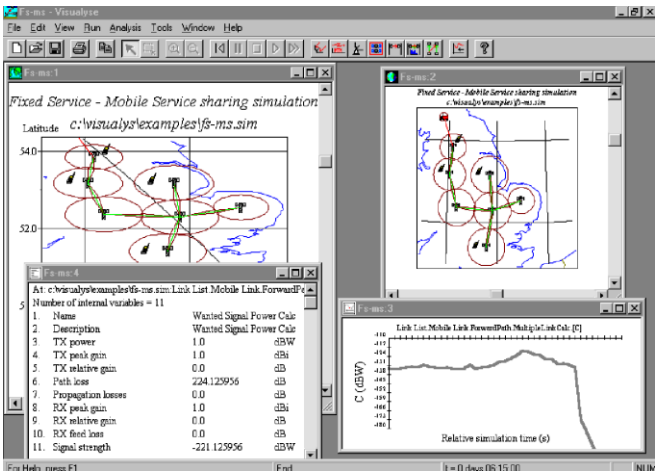
Visualyse V1 wasn't formally released but used to gauge reactions and to demonstrate privately to selected organisations. One such was the Radiocommunications Agency in the UK, later to be merged with other organisations to form Ofcom.

Visualyse V2 at WRC-95

The first formal release of Visualyse was V2, announced at the World Radiocommunication Conference (WRC) in 1995 in Geneva. We hired a room at the nearby Intercontinental Hotel and gave a presentation.

The software was functionally complete, able to analyse a wide range of scenarios being discussed that month in the CICG and ITU's meeting rooms.





We were delighted with the response and the first orders. But we could see there was much to do, and so re-invested those sales into development, building up a team.

Visualyse V3

The next version of Visualyse had a wide range of new features, including:

- New gain patterns
- New propagation models
- Electronically steerable beams
- Additional wizard to create service areas

- User defined Tracking Strategies
- Link Groups to handle diversity and end-to-end performance
- Text view
- Ability to log to file.

Increasingly, Visualyse began to be used for studies at the ITU. Using feedback from our users and our own experience in using Visualyse to undertake studies, we began working on a major update.

Visualyse Professional at WRC-97

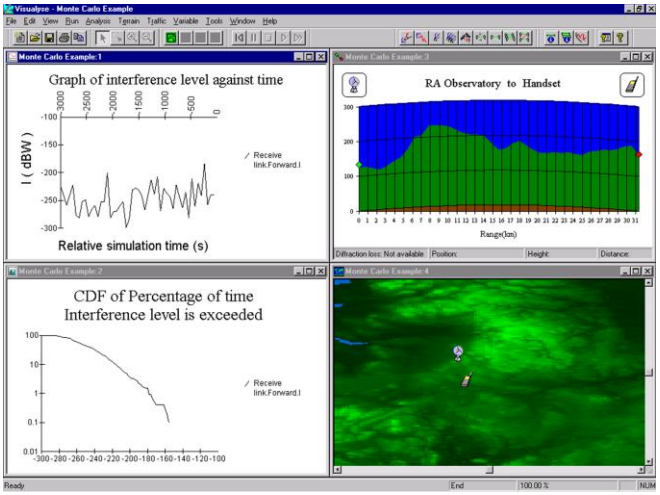
For WRC-97 we announced at significant update to Visualyse. There was also a new name: it was now Visualyse Professional.

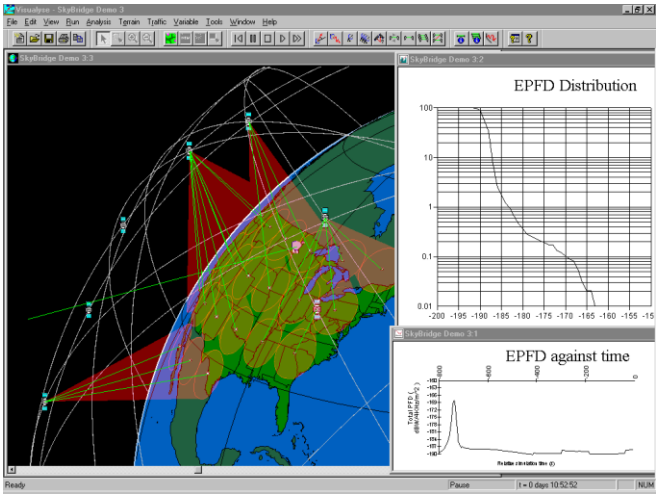
This major release could be enhanced by a number of modules, including:

- Terrain
- Traffic
- Variable Definition

These updates extended the ability of the tool to model scenarios involving terrestrial systems and undertake Monte Carlo modelling.

At the same time there was a host of additional features and updates to the user interface. It was almost a new product!





It was the time of the non-GSO MSS constellations and beginning of the first wave of non-GSO FSS, the likes of Teledesic and SkyBridge. These radical new systems required new simulation tools, and we made sure Visualyse Professional was able to model them.

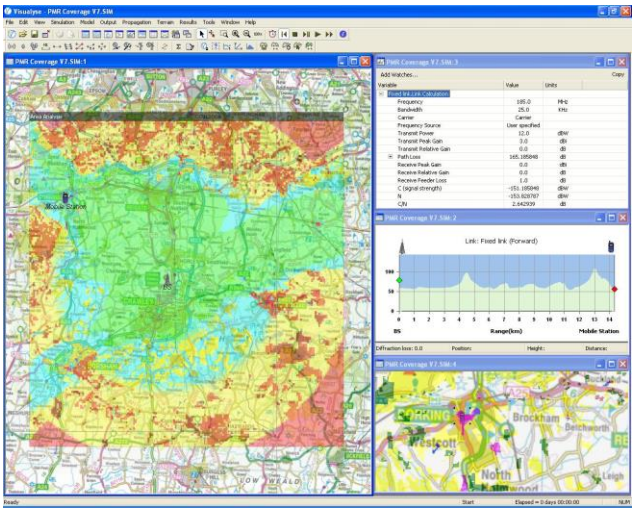
For example, ITU-R JTG 8D-9D developed Recommendation ITU-R M.1143 which described a methodology to facilitate coordination of non-GSO MSS systems with the fixed service. Implementations of this methodology were described as being the Standard Computer Program or SCP. In the final Chairmen's Report of this group it was noted that Visualyse was one of the example implementations of the SCP.

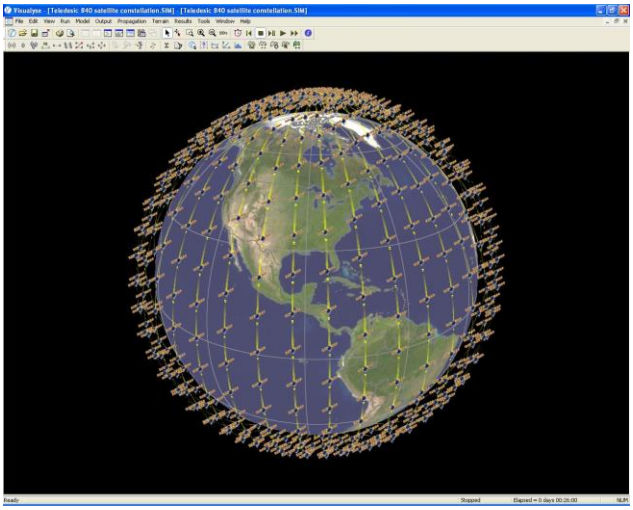
Another example would be the introduction of the Equivalent Power Flux Density (EPFD) metric during the work of the Joint Task Group 4-9-11. This would be the basis of the regulation of non-GSO FSS, including the EPFD limits in Article 22 and the algorithm in Recommendation ITU-R S.1503, as implemented by Visualyse EPFD.

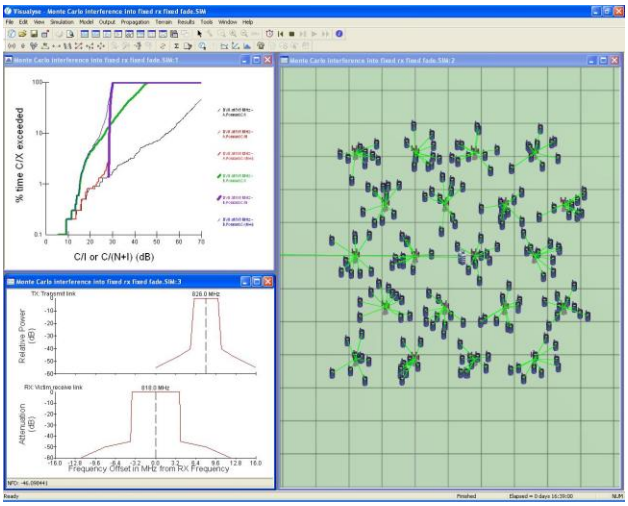
The development of new tools, such as Visualyse GSO and Visualyse EPFD, was one of the reasons why the product Visualyse was renamed Visualyse Professional, to identify the study tool under the Visualyse brand.

Visualyse Professional V5 and V7

Visualyse Professional 3 was updated to V5 and then V7. This latter update was the most significant, with a major revision to both the features and user interface.







Visualyse Professional Today

Today, Visualyse Professional is the most flexible study tool able to model a very wide range of radiocommunication systems, that can be used to analyse system performance including the impact of interference.

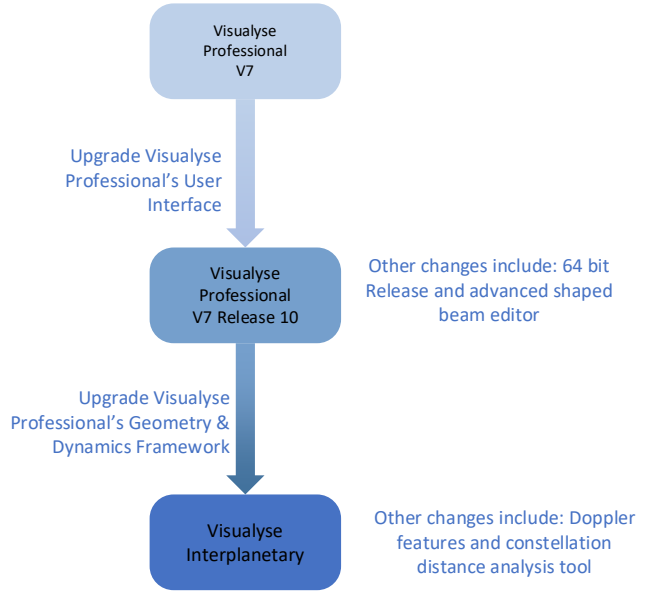
Visualyse Professional is able to model transmit and receive stations located at fixed positions, mobile stations, aircraft, ships and also satellite systems including Earth stations, non-GSO satellites, HEO satellites and GSO satellites.

It is able to be configured to analyse spectrum sharing scenarios using a wide range of methodologies, including static, input parameter variation, area, dynamic, Monte Carlo and combinations such as area Monte Carlo.

Visualyse Professional includes a wide range of advanced features to enable it to analyse both co-frequency and non-co-frequency scenarios, the impact of terrain or clutter, the impact of traffic and complex handover strategies between satellites. These features allow it to model anything from a 5G network to a non-GSO mega-constellations such as SpaceX's Starlink or OneWeb.

Development Plan

Following feedback from users, we have developed a two stage development plan for Visualyse Professional as shown in the figure below:



The development has been undertaken in two stages, with the intention that existing Visualyse Professional users will migrate to the first stage, described as Visualyse Professional Release 10, that has the advanced user interface and additional features described in this White Paper.

The second stage represents a significant update to the underlying geometry and dynamics framework to allow the modelling of missions to the Moon, Mars and other celestial bodies. This also includes an ellipsoidal Earth model and additional features and is called Visualyse Interplanetary.

More information about Visualyse Professional Release 10 and Visualyse Interplanetary can be found in a separate White Papers available soon.

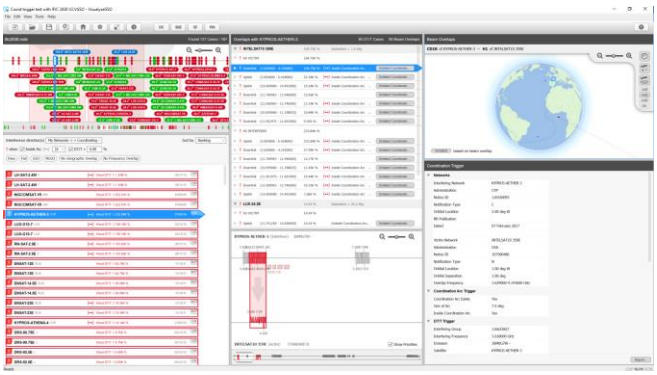
About Transfinite

We are one of the leading consultancy and simulation software companies in the field of radio communications. As well as Visualyse Professional we develop the market leading Visualyse products:

- Visualyse GSO
- Visualyse Coordinate
- Visualyse EPFD

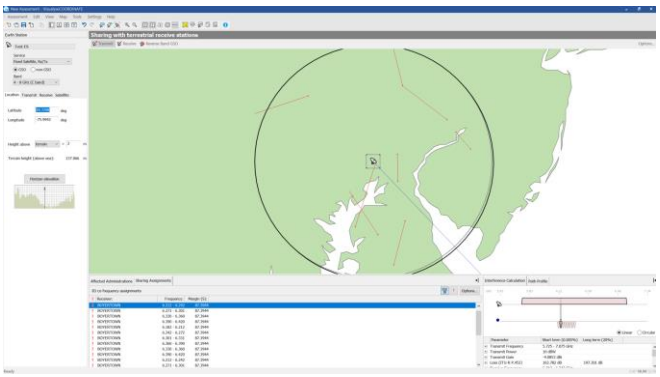
Visualyse GSO

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 Coordinate

We have developed Visualyse Coordinate to support the coordination of satellite Earth Stations:

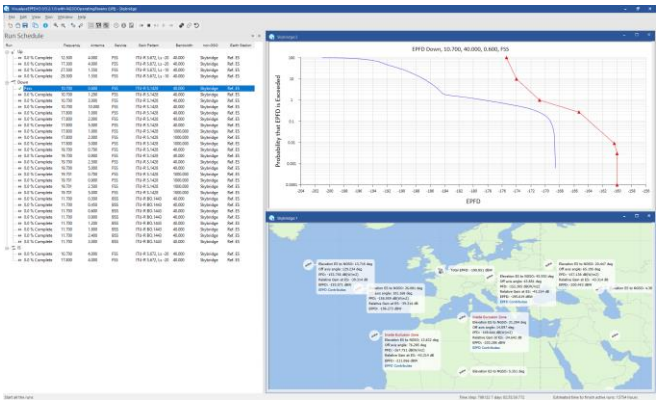


Visualyse EPFD

Our Visualyse EPFD software is the leading software 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 includes a graphical user interface that provides feedback on the calculation process and allows additional options to be modified.



Additional tools are available to assist in the generation of PFD masks.

Training Courses

We also provide training courses in the use of our products including advanced training that can cover modelling of specific systems and scenarios.

Consultancy Services

We can provide a wide range of consultancy services using our world-leading experts and software tools to rapidly generate solutions, including:

- Interference analysis and spectrum sharing studies
- Coordination support and meeting representation
- ITU-R and CEPT meeting representation and support
- Strategic consultancy to achieve regulatory goals.

Contact us

More information about these products and services is available at our web site:

http://www.transfinite.com

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

info@transfinite.com