We are broadcast planning craftsmen

Professional Broadcast Network Planning
Made Simple

Visualize Your Network Coverage Online
Ultimate Spectrum Management
The digital era requires more accurate planning

Regardless of planning and roll-out of a new radio network or meeting the increased capacity and quality demands with less frequency spectrum for your existing network, there is a dramatic need for more accurate planning.

The PROGIRA solutions including the products PROGIRA® plan, PROGIRA® reach and PROGIRA® manager, is an investment that will help you lower capital expenditures (CAPEX) by increasing the accuracy of the planning and roll-out of your radio network. This enables maximum efficiency and usage of your network elements lowering operational expenditure (OPEX).

- Experience shows that professional planning at an early stage creates savings of typically 10% in CAPEX
- Digital broadcast networks brings many new exciting opportunities but also makes planning more complex, a robust and quality assured digital network requires planning. In early stages, long before network deployment, potential problems can be solved and costly mistakes avoided.
- The Digital Dividend issues require efficient spectrum usage in order to improve and continue to deliver competitive services – this requires more accurate planning than ever before
- Using a professional and verifiable planning method in your project makes it easier to estimate final CAPEX and the OPEX, of great importance to investors
- Thorough planning coupled with advanced tools for verifying actual coverage makes it easier to keep advanced implementation projects on track, thus shortening the time to market
- A standalone and open GIS platform gives you the freedom and flexibility to enhance your business even further, based on your specific needs

PROGIRA® plan facilitates your ambition to maintain network coverage at the required level at all times also addressing the Digital Dividend area.

PROGIRA® reach handles communicating the network coverage internally and externally.

PROGIRA® manager is the cutting edge tool for spectrum management based on ESRI ArcGIS.

For added support, our network planning craftsmen – active in the broadcasting industry since the 80’s – are dedicated to provide fast, professional and flexible assistance as needed. PROGIRA exists to guide you every inch of the way – making sure you get there.

Example of portable indoor reception in Malaysia

PROGIRA solution areas

Our products PROGIRA® plan, PROGIRA® reach and PROGIRA® manager is developed to support solutions within the following areas:

- Network Coverage
- Infrastructure Investment Optimization
- Digital Dividend Possibilities
- Frequency Planning
- Digital Cartography
KPN, The Netherlands
At KPN we value being one of PROGIRA’s oldest customers. The relationship is based on trust for PROGIRA’s cutting edge competence and expertise which has always been a strong base for the ease of use and complete features of PROGIRA® plan, also ensuring its future development in line with the Broadcast industry developments. Over the years it has proven to be a winning combination providing accuracy in network planning and roll-out.

Rachid Boutahiri, Senior Network Planner at KPN

TERACOM, Sweden
We have a very long and good relationship with PROGIRA as they are a true spin-off from Teracom. For more than 10 years since then PROGIRA has continued to deliver high quality expertise and to develop the PROGIRA® plan product to meet our ever evolving technology needs. We are proud to still have PROGIRA as a well established supplier to us.

Lovisa Höglund, Senior Frequency and Network Planner

GLOBO, Brazil
At Globo, PROGIRA is the selected supplier of Broadcast Network Planning tools with the PROGIRA® plan product since many years ago. We have also been fortunate enough to use the vast expertise available in the PROGIRA solutions. It feels safe to have a product provider that can also provide all the planning expertise and support we need to back us up with efficient network planning, enabling us saving money in the digitization of the network.

Francisco Peres, Engineering manager at TV Globo

TP5, Russia
The selection of PROGIRA® plan for our Broadcast Network Planning needs was the result of a careful market evaluation. PROGIRA® plan came out as the winner being fully featured and user-friendly at the same time. The PROGIRA legacy of expertise has proven to be true and provides us with more then just a planning tool – its a future proof concept that now has been used in the efficient digitalization of TV covering more than 40% of Russia.

Leonid Mironov, Vice Managing Director

PROGIRA PRODUCTS

Professional Broadcast Network Planning Made Simple

PROGIRA® plan is the integral tool for planning truly cost-effective and spectrum-efficient network solutions.

Typical users: Suppliers of broadcast equipment, Network operators, Content providers, Consultancy companies, Investment companies.

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Visualize Your Network Coverage Online

PROGIRA® reach is a web based service for broadcast related companies to inform their TV viewers or the radio listeners of the reception quality in the service area.

Typical users: Network operators, Content providers.

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Ultimate Spectrum Management

PROGIRA® manager is the tool built on modern technologies for truly cost effective and efficient spectrum management taking into account all modern challenges in the field.

Typical users: Spectrum authorities.

see page 18
Less spectrum requires careful planning of your broadcast network

The digital Dividend means that UHF frequencies previously used only for broadcasting, will need to be shared by mobile services as well. ITU-R WRC-2015 decided to allocate the 700 MHz band on a co-primary basis to mobile services. Many countries will now license these frequencies to mobile services. This is a reality that needs to be planned for in order to minimise interference and define a proper framework for sharing. Broadcast networks need to be planned on less spectrum, using tighter frequency reuse, which may result in more interference. Careful planning is needed.

Formation of new DTT Single Frequency Network (SFN) areas.
Creation of new frequency plan for DTT.
Coordination of new DTT frequencies to reduce impact of having less spectrum.
Managing interference between broadcast and LTE networks.

Redesign DTT network to increase spectrum usage and maintain capacity
- Handle higher levels of interference.
- SFN replanning and optimization.
- Possibly add additional sites.

Need to manage interference from LTE and vice versa
- Interference from LTE terminals and base-stations.
- Need for additional filtering at receivers.
- Determining LTE possible network restrictions to avoid interference.

Increase accuracy of planning by fine-tuning propagation models.
Verify planned coverage.
Identify areas with coverage problems.
Customer support.
What is PROGIRA® plan?

PROGIRA® plan is a module-based radio planning tool especially focused on solutions for broadcast and mobile TV networks. Applications range from Microwave links; to analogue TV, FM/Synchronous FM and AM; and on to digital broadcasting systems including DVB-T/T2, ISDB-T, ATSC 1.0, ATSC 3.0, DTMB, DTMB-A, CMMB, T-DAB/DAB+, T-DMB, DRM, and DRM+.

PROGIRA® plan also includes specific functionality to resolve the Digital Dividend aspects of planning. The tools, which are based on internationally agreed planning norms and methods, can be used to present, analyze, and mitigate the impact wireless communication systems, such as LTE, will have on the existing digital terrestrial television networks when they are introduced on frequencies used for broadcasting.

In addition, it features advanced database capabilities and handling of the ITU, FCC (US) and CEPT (Europe) data formats, as well as several prediction models including CRC-Predict, IRT 2D/3D, Longley-Rice, ITU-R P.1812, and ITU-R P.1546.

PROGIRA® plan consists of a Base module and four function-specific modules - Microwave Link Planning, Network Planning, Frequency Planning, and Network Verification.

PROGIRA® plan uses ESRI ArcGIS, an open and widely used GIS platform that makes geographical presentations more user-friendly and eases the addition of new presentation formats and GIS applications.

Why PROGIRA® plan?

PROGIRA® plan incorporates decades of hands-on experience from our broadcast network planning craftsmen into every module, guaranteeing dependability and a work flow that ensures user friendliness. Continual development, managed by pioneers within digital broadcasting, ensures optimal solutions for ever-evolving needs and market requirements. The implementation of new standards and client-specific needs results in a continually enhanced product, benefiting from the experience of both our clients and our own craftsmen.

What are the benefits?

PROGIRA® plan is a user-friendly planning tool with all the functionality you need for pre-study, planning and evaluation of radio networks. PROGIRA® plan incorporates efficient and reliable tools for achieving networks with the desired quality and availability, at minimal cost.

Powered by ESRI’s ArcGIS, PROGIRA® plan handles all map data formats and features the most advanced GIS functionality in comparison with other radio network planning software.

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PROGIRA® plan modules and submodules

- **NETWORK VERIFICATION**: DVB-T/T2, ISDB-T, ATSC 1.0/3.0, Analogue TV
- **NETWORK PLANNING**: DTMB/-A, CMMB, T-DAB/DAB+, FM
- **FREQUENCY PLANNING**: T-DMB, DRM+, DRM, AM, LTE
- **MICROWAVE LINK PLANNING**: T-DMB, DRM+, DRM
- **BASE MODULE**: DVB-T/T2, ISDB-T, ATSC 1.0/3.0, Analogue TV
- **ESRI ArcGIS**
The Base Module sets the user friendly and specific broadcast network planning work flow of PROGIRA® plan. It also provides the full interface to the sophisticated and world leading ESRI ArcGIS tool for easy handling of all kinds of geographic data, enabling advanced calculations and customized presentations.

Transmitter handling

- BR International Frequency Information Circular (BR IFIC) interface;
- Import, export and filtering of transmitter data from ITU, FCC, CEPT, Microsoft Excel, and several other custom data formats. Customer specific formats can easily be integrated upon request.
- Link function to share data between PROGIRA® plan projects.
- Horizontal and vertical antenna pattern viewer and editor. Import and export from several antenna manufacturer formats.
- User log

Field strength prediction calculations


Field strength prediction sum


Analysis functions

- Population Coverage
- Area Coverage
- Analyze location
- Coverage Comparison (map algebra)
- Path Profile Viewer
- Visibility
- Interference search
Geographical databases

The Base module can be adapted to the needs of your planning project. It does not matter if it is planning for mobile reception in city environments or nationwide coverage for rooftop reception. PROGIRA® plan can handle everything from high resolution building data to free of charge data available through internet.

The Base module includes a basic package of geographical data such as Elevation data SRTM/GDEM, Clutter data (GLOBCOVER/CORINE), Population data (GPW), GiraMAP - PROGIRA’s powerful version of ITU Digitized World Map (IDWM), ESRI vector maps, ESRI ArcGIS online background maps and BING online map. Additional databases (maps) available upon request.
Optimisation tool to make the best of your SFN

PROGIRA® plan Network Planning Module offers a complete coverage planning environment for your broadcast and Mobile TV networks. It includes network planning support for Microwave Links and terrestrial broadcasting standards such as DVB-T/T2, ISDB-T, ATSC 1.0, ATSC 3.0, DTMB, DTMB-A, CMMB, T-DAB/DAB+, T-DMB, DRM+, FM and analogue TV. PROGIRA® plan also includes specific functionality to resolve the Digital Dividend aspects of network planning.

A prosperous network - use SFN Optimization tool to find the very best version of your network

In large SFNs, where the transmitter separation distance is longer than the guard interval, self-interference zones might occur within the required service area. These zones might have a strong negative impact on the network coverage probability. The network planner can apply several different approaches to mitigate the negative effect of the self-interference zones. The self-interference zones can for example be “moved” to areas outside the required service area by assigning delays on the transmitters that builds up the SFN.

Doing this manually is a tedious and time consuming process. To help the network planner in this process PROGIRA® plan has been equipped with the SFN Optimization tool. This tool uses an advanced optimization algorithm that automatically assigns the transmitter delays so that the self-interference zones are moved to areas with least impact on the population or area coverage.

Other parameters that can be optimized to mitigate the effects of the self-interference zones are: transmitter locations, transmitter powers, antenna heights, antenna patterns, antenna down tilting, polarization, etc.

Use of SFN gap fillers cuts costs

Using the SFN gap filler technique is an effective way to reduce the cost of network implementation and to simplify the design of the digital broadcast network. Gap fillers receive signals from a main station “off air”, eliminating the need for a direct program feed to each site. This approach is especially effective in mountainous terrain and in built-up areas, but to take full advantage of the technique, careful planning is required. In PROGIRA® plan, gap filler planning is both simple and efficient because it allows users to analyse the network before implementing it, thus reducing the risk of costly mistakes.
Key features

**SFN and MFN support** – single and multiple frequency network planning including SFN gain and self-interference calculations.

**External interference calculations** – to determine to what degree your network interferes with other operators’ networks.

**SFN Optimization** – allows you to optimize your coverage.

**Gap filler planning** – to increase the coverage of digital broadcast systems in a more cost-effective manner by filling gaps in the radio coverage.

**Summation methods** – Monte Carlo simulations and log-normal summation methods such as Schwartz and Yeh, k-LNM and Power Sum.

**Analyze Location** – a coverage analysis and optimization tool.

**Receiver synchronization modelling** – makes it possible to simulate how the receivers and antennas will work in the network.


*PROGIRA® plan Network Planning Module: SFN Impulse response function.*
Network & Frequency planning software for ATSC 3.0

ATSC 3.0, the new US television broadcast standard, is one example of the continuous evolution of PROGIRA® plan helping our clients to improve the value of their software. PROGIRA will closely follow the development of new broadcast systems and implement those in PROGIRA® plan as soon as they are standardized.

ATSC 3.0

ATSC 3.0 is similar to the other existing DTT standards, like for example DVB-T/T2, ISDB-T and DTMB (Chinese standard), all using multicarrier OFDM but contains more features. The possible modulation schemes available are QPSK, 16QAM, 64QAM, 256QAM, 1024QAM and 4096 QAM, using non uniform constellations.

This makes it possible to provide robust services using low bitrate for mobile/portable receivers up to very high bitrates requiring a high C/N, aimed at rooftop reception. Bitrates range from 1.5 Mbit/s with a C/N of say -5 dB up to say 50 Mbit/s requiring a C/N of well above 30 dB (6 MHz), suitable for Ultra High Definition (UHD) transmissions.

If the capacity provided in one RF channel is still not sufficient two RF channels can be combined to double the transmission capacity, so called channel bonding.

Another example where more choices in system parameters is offered, is the number of allowed pilot patterns. While for example DVB-T2 has 8 different options ATSC 3.0 has 16 different options. This makes adaption of the service to special reception conditions easier.
LDM implementation in ATSC 3.0

One very interesting new feature is also the inclusion of Layer Division Multiplexing (LDM) in baseline specification (mandatory). This makes it possible to broadcast two service layers, an upper and a lower layer. These two layers are transmitted with different robustness (modulation and code rate).

The upper layers requiring a low C/N for mobile reception and a lower layer which is less robust, injected at a lower power level. In this way it is possible to efficiently combine mobile and rooftop reception services in the same transmission.

PROGIRA® plan will handle all these possible system parameters which will make it easy for our clients to predict a certain network implementation before investing in the infrastructure.

SFN and coordination support

In order to meet the requests from our users PROGIRA has also developed planning support for ATSC 3.0. The ATSC module will also support use of SFN and LDM services with different robustness as well as support for frequency planning and coordination of ATSC 3.0 services within the existing regulatory framework.
Verification for sustainable networks

PROGIRA® plan Network Verification Module lets you present, analyse and compare field measurement data which can be imported from all measurement systems with text file export functionality.
Fine-tuned propagation models increase accuracy of planning

To limit the cost of network infrastructure operators prefer to build as few sites as possible without compromising signal quality in the service area. In digital broadcast networks, and especially when using SFN, it is critical to maintain high signal quality. During the network planning process coverage is predicted using different propagation models. To verify the coverage and to fine-tune these predictions, measurements are needed. Prediction models may then be calibrated by comparing actual measurements with predicted field strength.

Key features

- Presentation of field measurements
- Fine-tuning of propagation models
Microwave Link Planning Module

To support the transmission network planning between broadcast sites a Microwave Planning Module is available in PROGIRA® plan. The module offers path calculation including path clearance, ground reflections, interference and performance and availability calculations. The calculations are based on the latest ITU recommendations and a customizable equipment database for different radios, antennas and feeders.

Key features

- Path profile with clutter distribution.
- Path calculation for receiver input level.
- Ground reflection and path clearance calculation including minimum antenna height needed.
- Frequency-, Space- or Combined diversity to improve performance and availability.
- Interference calculation between consecutive and cross radio links.
- Search for interfering radio links.
- ITU and user defined frequency plans.
- Equipment database for different radios, antennas and feeders.
PROGIRA® plan Frequency Planning Module enables you to optimise your use of frequencies, making the most of a scarce resource. Whether you are a regulator planning for optimal use of spectrum, or an operator planning to roll-out a digital broadcasting network, PROGIRA® plan helps you coordinate and optimise the use of frequencies with maximum efficiency while complying with international regulations and bilateral agreements.

**Key features**

- **Allotment/SFN editor** enables creation of user-defined allotment contours and linked SFN transmitters.
- **Coordination contour** calculates contour areas where transmitters, allotments, or GEO6 plan entries generate a certain field strength level.
- **Field strength on country borders calculations.**
- **ERP restrictions** calculates the necessary power reductions that are needed in certain azimuths to reach a given field strength level on country, allotment, or user-defined boundary points.
- **Conformity check** ensures that a network implementation conforms to the corresponding GEO6 plan entry.
- **Frequency scan** enables optimization of the use of frequencies.
- **Coverage contour** calculates noise and interference limited coverage contour areas for a transmitter.
- **FCC coverage and interference**
Visualize your network coverage online

What is PROGIRA® reach?

PROGIRA® reach is a web application for broadcasters and network operators to visualize their network coverage online. The product enables presentation of service coverage areas, for all possible receiving conditions, to their customers or internally in an easy and user-friendly way.

Why PROGIRA® reach?

PROGIRA® reach is the perfect tool to increase the support to end consumers, especially when there has been changes in the infrastructure. PROGIRA® reach also makes it easy to visualize and communicate network improvement plans internally.

Values for a broadcaster or a network operator:

- Reducing the number of support tickets
- Support when installing an antenna at end consumer

- Excellent market communication
- Easy and fast internal communication
Description of PROGIRA® reach

The user is presented with a scrollable, zoomable map of a defined area. When the user clicks on a location on the map, two icons appear. These icons are bound together with a thin line (thin line only for rooftop reception) and show the position where the user clicked and the position of the best transmitter. Also, a third icon is showed, presenting a second-best transmitter in case the first choice does not work because of terrain obstacles or other problems. As an alternative to clicking on the map, a geocoding approach is also provided, where the user enters his an address and gets the desired transmitter information. Also, a coverage map is displayed, and there will be different coverage overlays for outdoor and indoor reception modes.

Excellent support to end consumers

How to get PROGIRA® reach as a webservice

STEP 1 - A detailed workshop meeting in order to set the scope of functionality by the PROGIRA® reach web service. The standard functionality is briefly described above.

STEP 2 - Decide the source from where to generate the initial data needed by PROGIRA® reach. If you already have PROGIRA® plan you can easily generate the project data needed. If you are using an alternative solution regarding coverage maps please contact PROGIRA to guide you how to generate data to be exported to PROGIRA® reach. PROGIRA can also help you to generate the data needed as a service.

STEP 3 - PROGIRA® reach hosted by PROGIRA or installed on your web server.

STEP 4 - Decide how you want the coverage maps to be updated. Either you do it yourself with our back-end support or you engage PROGIRA to handle it as a service.
Ultimate spectrum management

What is PROGIRA® manager?

PROGIRA® manager is a specialized software product designed to automate the functions of radio authorities, improve their performance and reduce the likelihood of error and, therefore, each stage of its development takes into account the specificities of the relevant laws and regulations. Laws and regulations determining precise needs of the client are very different in different countries; therefore this product is designed to be customizable to the specific technical and legal environment. The basic PROGIRA® manager product provides a solid basis for the customization of the product to a specific technical and legal environment of a specific customer.

PROGIRA® manager meet the requirements of the relevant ITU-R Recommendations as specified in the following documents and other related ITU documents:

- SM.1047 "National Spectrum Management”;
- SM.1370 "Design guidelines for developing advanced automated spectrum management systems”;
- SM.1537 "Automation and integration of spectrum monitoring systems with automated spectrum management”.
- SM.1049 : “A method of Spectrum Management to be used for aiding frequency assignment for terrestrial services in border areas”

Why PROGIRA® manager?

PROGIRA® manager is a user friendly tool for radio frequency administration and transmitter license management.

- Values for a frequency coordinators:
- Easy tracking of international frequency coordination process.
- Professional management of transmitter licenses.
- Quick access to data for billing purposes and other tasks required.
The spectrum management processes and functions

Application process

This process supports the data entry of the application form, application validation and processing for any authorization requests, and includes the following functions:

- Data entry of application information
- Control and Track the processing of license/concession applications.
- Data validation

Frequency planning provisioning process

This process supports the processing and analysis required to approve a requested frequency assignment, or to respond to a request for international coordination from a neighboring country administration.

Authorization process

This process manages the administrative functions involved in issuing, renewing and modifying licenses.

- Issue a license that has been indicated as ready
- Increase the fee for an existing license
- Amend license information
- Suspend and reinstate a license
- Cancel licenses
- Support data entry of new license applications

Fee processing

This function allows the setting and changing of fee rates. It also supports the management of financial tasks, such as recording of fee payments, payment transactions, payment status associated with licensing and certification functions, production of invoices, and production of financial statements in statistical or individual format. The fee processing function will also support the exportation of financial data to an external commercial accounting package.

Report processing

PROGIRA® manager is capable of producing a number of built-in standard notices, invoices, correspondence, engineering analysis results, text format reports, and graphic reports, available to the operator via the report processing function.

Complaint processing

This function supports the efficient processing of interference complaints through the following steps: record the complaint, check the complaint for administrative merit, analyze the complaint for technical merit, and track complaint through to resolution and issue resolution closure report.

Transaction processing

This function creates a record in the database, registering the date, time and identity of the operator who performs each transaction.
What is ESRI ArcGIS?

ESRI is a world-leading supplier of GIS software. ArcGIS allows you to use one common platform to meet all your requirements for a professional GIS solution, and is built using technology standards for easy integration with your existing systems.

ArcGIS - a standalone and open GIS platform

PROGIRA® is an authorized business partner with ESRI, the world-leading provider of GIS systems. The open ESRI ArcGIS platform makes it easy to integrate different map formats and to add new applications.

The ESRI ArcGIS platform enables a holistic approach to your business by offering add-on modules and specific functionality for covering different business phases from market analysis, network planning, engineering and construction, to service and customer care. Below are some examples of ESRI ArcGIS functions that together with PROGIRA® plan can bring added value to our clients.
View your coverage maps in Google Earth

All your coverage maps can easily be exported to Google Earth, thus enabling a visual 3D presentation of the data that is very suitable for presentations.

Geographical analysis and post processing of databases

With ESRI ArcGIS you can perform advanced geographical analysis of data. For example, these tools can help you identify the most optimal site acquisition, find the most suitable building, highest altitude and nearest access to electricity. You can also optimise transmitter site parameters taking into consideration different economic factors of importance, e.g. population density and road infrastructure. You can easily analyse the coverage along roads, which is extremely important when planning mobile services.

Customized presentations

The ESRI ArcGIS toolbox enables you to adapt your PROGIRA® plan presentations for every possible need. All map layers can be processed individually and presented in the manner you choose. Import of new maps is easy because ESRI ArcGIS supports most data formats in use on the market.
PROGIRA® plan basic - 3 days

Objectives: This user training course provides theoretical and practical knowledge on using the PROGIRA® plan software solution for professional network and frequency planning. After completing this course, delegates will be fully prepared to use and take advantage of the software in their daily work.

Target groups: Operators and broadcast planning engineers using PROGIRA® plan

PROGIRA® plan advanced - 3 days

Objectives: This advanced user training course provides advance knowledge on using the PROGIRA® plan software solution for professional network and frequency planning. We also cover a number of ArcGIS features which are useful in the planning process. After completing this course, delegates will have in-depth knowledge of features and calculation procedures used in the software. The course can also be tailored to fit the needs of your organisation.

Target groups: Operators and broadcast planning engineers using PROGIRA® plan

Network and frequency planning for Digital TV systems - 5 days

Objectives: This training course provides theoretical and practical knowledge on the digital TV standards, in particular the DVB-T/T2 systems. The frequency and network planning process is dealt with in detail, the steps and network options as well as an overview of the different tools needed to successfully plan a DTT network. After completing this course, delegates will have a good overview of the whole network planning process and the possibilities related to Digital TV.

Target groups: Operators and broadcast planning engineers.

DVB-T2 planning and network design - 5 days

Objectives: This training course aims at providing theoretical and practical knowledge about the DVB-T2/Lite system and how to build a complete transmission network. The course covers the complete distribution chain to the network planning and implementation. After completing this course, delegates will understand the technology behind DVB-T2 and have basic guidance on planning and implementing DVB-T2 network. Particular focus is on SFN network design and implementation. During the course we also establish a “full” DVB-T2 distribution chain in order to demonstrate features of DVB-T2 and options in network deployment.

Parts of the content can be customised into an interactive workshop where the particular needs of your organisation are dealt with. This option is particularly useful for organisations before the actual deployment of a T2 network.

Target groups: Operators and broadcast planning engineers.

T-DAB+ System, network and frequency planning - 3 days

Objectives: The T-DAB(+) system, network and frequency planning course provides knowledge on how to plan a T-DAB network. Important system properties are covered as well as the procedure for planning T-DAB networks in order to achieve the desired coverage. DAB SFN planning is covered in detail. A comparison with other sound broadcasting systems is also provided.

Target groups: Operators and broadcast planning engineers.

ATSC 3.0 System and network planning using SFNs - 3 days

Objectives: The training course covers the new US ATSC 3.0 System, its capabilities and options. Special attention is paid to the selection of system parameters and the design and planning of ATSC 3.0 SFNs. We will also look at a few network planning SFN design examples.

The course also gives an overview of Layer Division Multiplexing (LDM) which is an interesting part of the ATSC 3.0 standard. After the course the delegates will have a basic knowledge of the system and its possibilities. The course can also be tailored to meet the particular requirements your organisation may have.

Target groups: Operators and broadcast planning engineers.
We offer maintenance contracts for all our products including software updates and continuous access to our support team.

**PROGIRA® maintenance includes;**

**Technical support**

We provide technical support and assistance in the use of our software as well as diagnosis and correction of any problems related to our software.

**Software updates**

Updates includes functional enhancements, error corrections, adaptions to new versions of the operating system and/or improvements for additional system devices or functionality.

**Help Desk**

Technical support and assistance through our certified support team via e-mail, web-services and telephone during normal office hours (weekdays 09.00 - 16.00 CET). Continuous updates regarding known problems, workarounds and available error corrections. We can provide remote desktop support via TeamViewer.
At PROGIRA® we want to make a difference. By identifying actual client needs, we can provide truly great solutions—and real value—to the organizations we work with. We started out as pioneers in our field in 1990. Today we provide cost effective network solutions and our expertise to clients in more than 50 countries.

PROGIRA is an independent solution and software provider within the following areas:

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<th>Network Coverage</th>
<th>Infrastructure Investment Optimization</th>
<th>Digital Dividend Possibilities</th>
<th>Frequency Planning</th>
<th>Digital Cartography</th>
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<tr>
<td>Provides the skill set and experience needed to get the best possible network coverage</td>
<td>With our experience in network planning you can be confident that your network will be optimized for both cost and operational requirements</td>
<td>Defines a proper framework for sharing frequencies previously used only by broadcasting</td>
<td>Facilitates the introduction of new frequencies and guide you through the international frequency coordination process</td>
<td>Helps you to understand what is required by the geographical databases in order to be able to make a reliable broadcast network plan</td>
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