Atoll

Wireless Network Engineering Software

version 3.4

Forsk

Atoll Overview

Atoll is a multi-technology wireless network design and optimisation platform that supports wireless operators throughout the network lifecycle, from initial design to densification and optimisation.

Atoll includes integrated single RAN–multiple RAT network design capabilities for both 3GPP and 3GPP2 radio access technologies including 5G NR, LTE, NB-IoT, UMTS, GSM, and CDMA. It provides operators and vendors with a powerful framework for designing and optimising current and future integrated multi-technology networks.

Atoll supports the latest technology advances such as massive MIMO, 3D beamforming, and mmWave propagation for the design and roll-out of 5G networks.

Atoll's integration and customisation features help operators smoothly streamline planning and optimisation processes. Atoll supports a wide range of implementation scenarios, from standalone to enterprise-wide server-based configurations.

With more than 9000 active licenses installed with 500+ customers in 140 countries, Atoll has become the industry standard for radio network planning and optimisation.

Supported **Technologies**

• 5G NR	• LTE/LTE-A Pro	• NB-IoT
• UMTS	• GSM	• CDMA
• TD-SCDMA	• LPWA	• Wi-Fi
• WiMAX	• Microwave Backhaul	

Atoll Highlights

Atoll uniquely combines architectural and functional features that provide operators with a powerful, scalable, and flexible framework for streamlining their network design and optimisation processes.

Multi-technology **Network Modelling**

Atoll is a comprehensive multi-technology radio planning and optimisation platform which includes unified multi-technology traffic models, Monte Carlo simulators, and automatic cell planning (ACP). Atoll can model the traffic-related aspects of multi-technology networks and dynamically spread traffic across 2G, 3G, 4G, and 5G network layers comprising macro, micro, small cells, and Wi-Fi hot spots.

5G Network **Design**

Atoll's modular and advanced 5G NR radio technology modelling capabilities, along with the support for mmWave propagation, massive MIMO, and 3D beamforming, provide operators with a flexible and evolutionary framework for the design and deployment of 5G networks.

Prediction and Measurement-based **Planning and Optimisation**

Atoll offers unique capabilities of using both predictions and live network data throughout the network planning and optimisation process. Live-network data (KPIs, UE/cell/MDT traces, and CEM data) add real-world information to predictions allowing for enhanced modelling of traffic evolution, hot-spot identification, and radio signal propagation. Live-network data can also be used in Atoll to drive the planning process (small cell selection) and to steer the optimisation algorithms of the AFP and the ACP.

High Performance **GIS**

Atoll incorporates a high-performance built-in geographic information system (GIS) exclusively designed for radio network planning and optimisation. Atoll's 64-bit GIS engine allows working with high-resolution and large-scale geo data while delivering high performance in data manipulation and display. Atoll supports web map services, online maps (Bing, OSM, etc.), and standard formats including BIL, TIF, BMP, Vertical Mapper, ArcGIS, MapInfo, etc. Atoll smoothly interfaces with commonly used desktop GIS such as MapInfo and ArcGIS.

In-built **Customisation Capabilities**

Atoll's in-built task scripting and integration capabilities enable data as well as service-level integration, allowing operators to streamline network planning and optimisation processes.

Atoll ..... Modular Configuration

Atoll is based on a modular architecture that makes it adaptable to operators' configurations, technologies, and functional requirements.

Atoll Core is the central module that supports the user interface, GIS features, the propagation modelling engine, data management services and interfaces. All technology modules run on top of Atoll Core.

Atoll Live module allows combining live network data such as KPIs, UE/cell/MDT traces, and crowdsourced data with predictions and further extends Atoll accuracy. Using the Live module, the Atoll Automatic Cell Planning (ACP) can integrate KPIs, UE/cell/MDT traces, and crowdsourced data to drive site selection, optimisation, and configuration processes.

Atoll Microwave is a comprehensive microwave link planning software. It is based on the Atoll Core platform and can be integrated with Atoll radio-planning configurations. Atoll Microwave includes nLOS/NLOS capabilities for small cell backhaul, as well as advanced LOS modelling.

Aster and Aster mmWave, both part of the same package, are advanced ray-tracing propagation models that support multiple propagation scenarios and frequencies both below and above 6GHz.
CrossWave is a universal high-performance propagation model developed by Orange Labs. It supports all wireless technologies and all types of environments, from rural to dense urban areas.

ATOLL MODULES	TECHNOLOGIES										
	5G NR	LTE/LTE-A	NB-IoT	UMTS/HSPA	GSM/EDGE	CDMA2000 1xRTT/EV-DO	TD-SCDMA	Wi-Fi	WiMAX	Non-3GPP IoT	Microwave Links
Atoll Core	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Live	✓	✓	✓	✓	✓						
5G NR	✓										
LTE		✓	✓								
NB-IoT			✓								
UMTS				✓							
GSM					✓						
CDMA						✓					
TD-SCDMA							✓				
WiMAX/BWA								✓	✓		
LPWA										✓	
Microwave Links											✓
Measurements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
AFP	✓	✓	✓		✓			✓	✓		
ACP	✓	✓	✓	✓	✓	✓		✓	✓	✓	
ASP		✓	✓	✓	✓	✓			✓		
Aster	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CrossWave	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Backhaul Capacity Planning											✓

✓ Required ✓ Optional for the selected technology

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5G NR

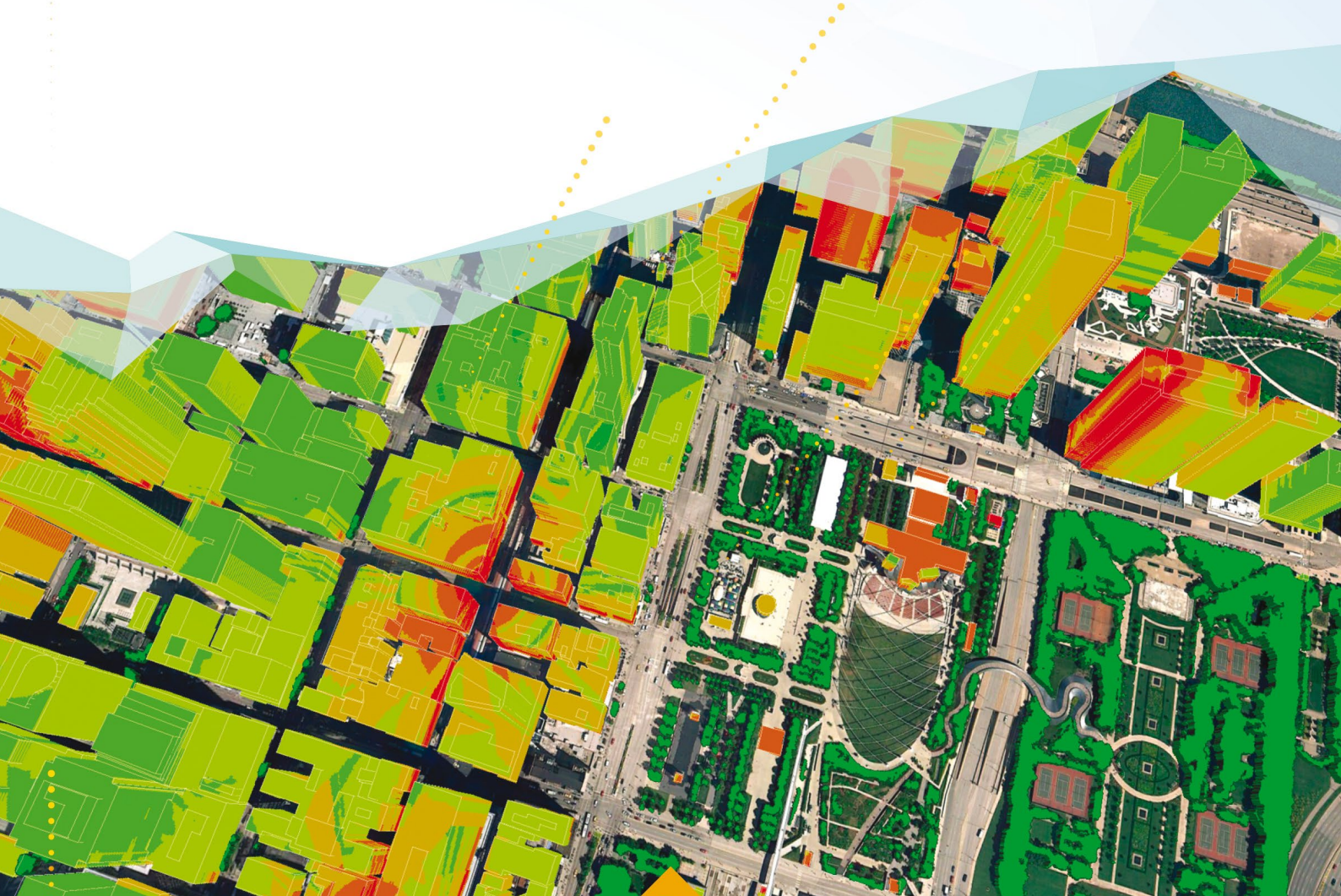
Atoll 5G NR module allows operators to plan and optimise 5G networks based on the 3GPP specifications. Atoll supports both 5G NR NSA (Non Standalone) and 5G NR SA (Standalone) modes.
Atoll's modular and advanced radio technology modelling capabilities, along with the support for mmWave propagation, massive MIMO, and 3D beamforming, provide operators with a flexible and evolutionary framework for the design and deployment of 5G networks.

Atoll 5G NR Features

- Modelling of 5G NR standalone (SA) and non-standalone (NSA) modes
- mmWave propagation modelling
- 3D beamforming & massive MIMO
- Automatic macro and small cell site selection
- Dual-connectivity with LTE-A Pro
- Automatic PCI and PRACH RSI planning

5G is a new paradigm for radio planning and optimisation activities, as huge amounts of predicted and live-network data need to be used for 5G network design. As an example, automatic planning and configuration of new cell sites in mmWave frequencies requires evaluating large numbers of candidates and generates intensive calculations to select the best configuration parameters at the design stage.

The Atoll platform has been designed to handle large amounts of data that come with 5G: site and network database, geographic data, path loss data, CW measurements and drive test data, as well as KPIs, UE/cell/MDT traces and crowdsourced data.



Atoll Live

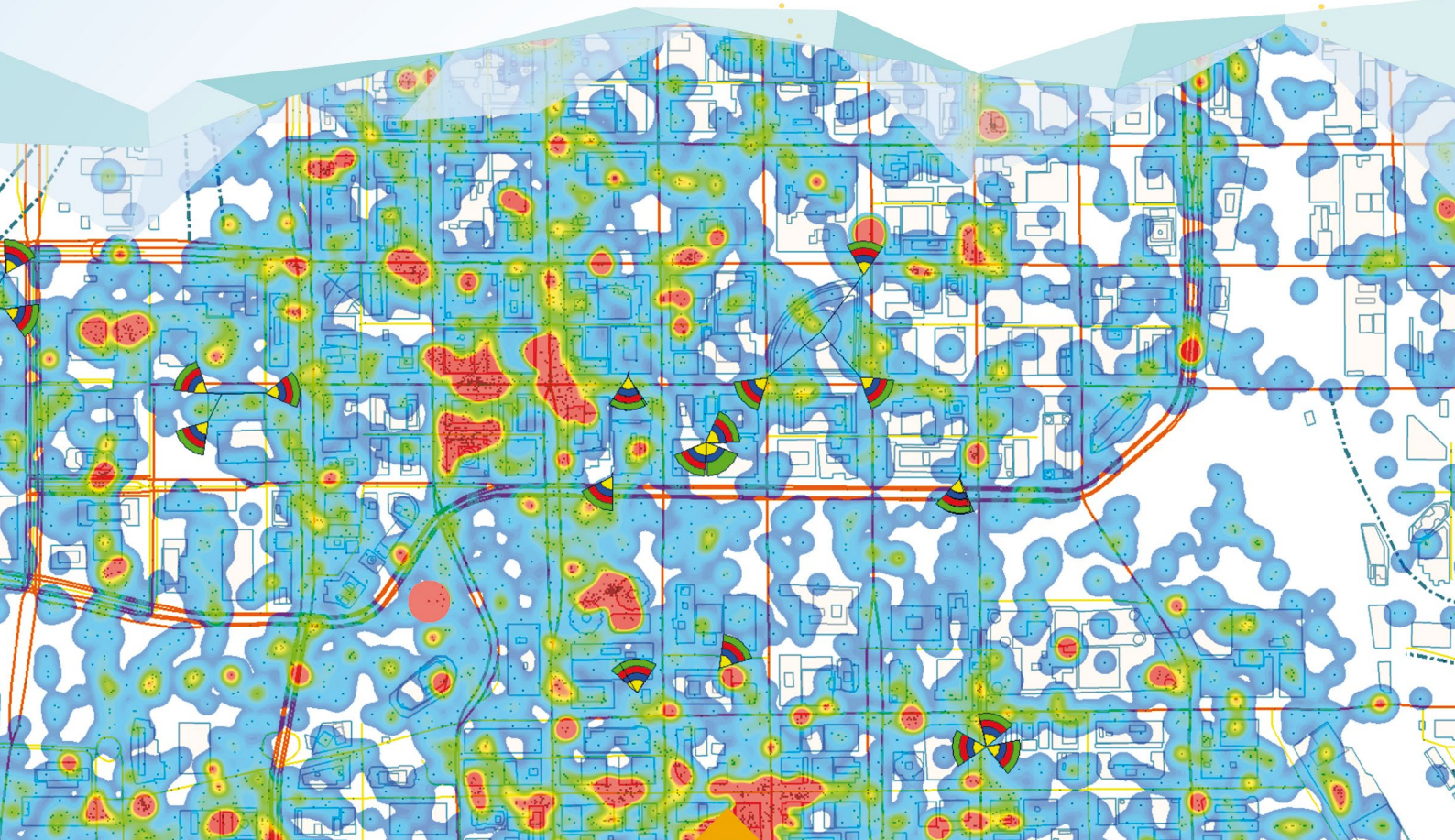
Atoll and its Live module combine prediction-based and measurement-based planning and optimisation techniques into a unique hybrid solution. Atoll allows incorporating KPIs and UE/cell/MDT traces, and crowdsourced data in order to add real-world information to predictions in a number of planning and optimisation tasks, hence extending both accuracy and scope of use.

Atoll Live Network Planning and Optimisation Functions

- Combined predicted and measured path losses
- Combined prediction and measurement-based coverage plots
- Automatic neighbour planning
- Live traffic maps and heat maps
- Site selection and greenfield design (ACP)
- Network optimisation (ACP)
- PCI and PRACH RSI planning (LTE/NB-IoT AFP)
- Frequency and BSIC-BCCH planning (GSM AFP)

Atoll Live allows importing data from files, databases, and directly from the OSS using vendor-specific OSS interfaces designed to pre-process the data. Atoll Live allows importing multi-technology, multi-vendor KPIs, performance management (PM) and configuration management (CM) data, as well as multi-technology UE/cell/MDT traces and crowdsourced data from multiple sources.

The Atoll Live module also includes UE/cell trace geolocation capabilities based on an intelligent combination of cell ID, timing advance, OTDOA, and RF pattern matching methods.



About **us**

Forsk is an independent software company providing operators and vendors with wireless network design and optimisation products. Atoll, Forsk's flagship product, is a multi-technology wireless network design and optimisation software that allows operators to streamline planning and optimisation activities by combining predictions and live network data. With more than 9000 active licenses installed with 500+ customers in 140 countries, Atoll has become the industry standard for wireless network design and optimisation.

Naos is Forsk's automation and integration platform dedicated to wireless network planning and optimisation. Naos is a non-interactive server-based platform that enables operators to automate planning and optimisation processes as well as integrate radio planning and optimisation calculations with enterprise applications. Naos is fully compatible with Atoll.
Atoll and Naos provide operators with a comprehensive framework for integrated, interactive, and fully automated wireless network planning and optimisation.

Atoll is available through Forsk's offices and technical support centres in France, USA, and China as well as through a worldwide network of distributors and partners.

Forsk **at your side**

Since the first release of Atoll, Forsk has been known for its capability to deliver tailored and turn-key radio planning and optimisation environments.
To help operators streamline their radio planning and optimisation processes, Forsk provides a complete range of implementation services, including integration with existing IT infrastructure, customisation, as well as data migration, installation, and training services.

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