
ATDI
ADVANCED SPECTRUM SOFTWARE
THE REFERENCE TOOL FOR ELECTRONIC WARFARE AND TACTICAL COMMUNICATIONS.
30 YEARS
OF EXPERIENCE
www.atdi.com

ATDI in a few words…

ADVANCED SPECTRUM SOFTWARE

More than 30 years experience in the spectrum management domain and spectrum engineering

Provides software and services in radio communication

- Communication Electronic Warfare
- Radio mission planning & management
- Spectrum management & monitoring
- Digital cartography

Our Partner's Customer Base

Over 2,000 clients in every sector of Radio from Civil Aviation Authorities and commercial operators to military networks and regulatory bodies

Main markets

- Telecom operators / Broadcasters
- Regulators / Civil Aviation Authorities
- Military forces / Emergency services
- Telecom Equipment Manufacturing/ Engineering Services consulting firms

Proven solutions recognized by more than 50 MoD/MoI

ATDI have 30 years experience in the radio planning and Military Spectrum Management

- Proven solution that is recognized by the most prestigious military Organizations
- Military solutions off-the- shelf and are adapted to customer specific requirements
- Open Interface with any third application systems or vendor equipment's (DF, Monitoring systems, Northbound Interface, etc.)
- Regular software updates according to the latest technologies and military rules/requirements

Some military references

ATDI
ADVANCED SPECTRUM SOFTWARE


MOD of Bahrein


E.A.U Air Force


Border Guard of Kingdom of Saudi Arabia


MOD of Kingdom of Saudi Arabia


Minister of Defense of Algeria


Portuguese Air Force


US department of Homeland security

French Air Force


Armed forces of UK

French Marine

Ministry of Defense France


US Coast Guard

THALES

Airbus DEFENCE & SPACE

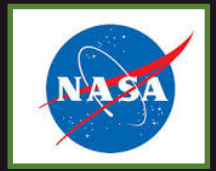
Lockheed Martin

Prince Sultan Advanced Tech. Research Institute

Défense Conseil International


Ministry of Défense of Greece

US Department of Homeland Security



NASA

General Dynamic

U.S AIR FORCE

NSA (National Security Agency)


Belarusian Armed Forces


Air Force Switzeland


Indian Air force Army

Royal Air Force UK

Raytheon


Armed forces of Russia


Ministry of Defence of Serbia

Armaments Corportaion of Sourth Africa SOC ltd

Ministry Of Defence Norway

RUAG Electronics Switzerland

Software products

ADVANCED SPECTRUM SOFTWARE

HTZ
WARFARE EDITION

HTZ WARFARE:
RADIO PLANNING /SPECTRUM ENGINEERING/EW (ELECTRONIC WARFARE)

The most advanced radio network planning solution for the design and optimization of radio networks (from a few kHz to 350 GHz):

- Spectrum engineering: frequency coordination, automatic frequency assignment, interference analysis, spectrum optimization
- Comprehensive toolbox for modeling all the radio communications technologies in the MF/HF/VHF/UHF/SHF/EHF frequency bands. The software includes Electronic Warfare and tactical communications functions to provide accurate simulation of the battlefield for advanced tactical mission planning.

ICS manager
WARFARE EDITION

ICS MANAGER
SPECTRUM MANAGEMENT & MONITORING

DYNAMIC SPECTRUM MANAGEMENT

E-GOVERNMENT

ICS RF ALLOCATIONS EDITOR

Automated Military Spectrum management and Electronic Warfare Systems

ADVANCED SPECTRUM SOFTWARE

HTZ WARFARE- THE MOST COMPREHENSIVE SOFTWARE FOR:

- Radio planning and optimization
- Mission planning
- Frequency management
- Spectrum engineering
- Communication Electronic Warfare

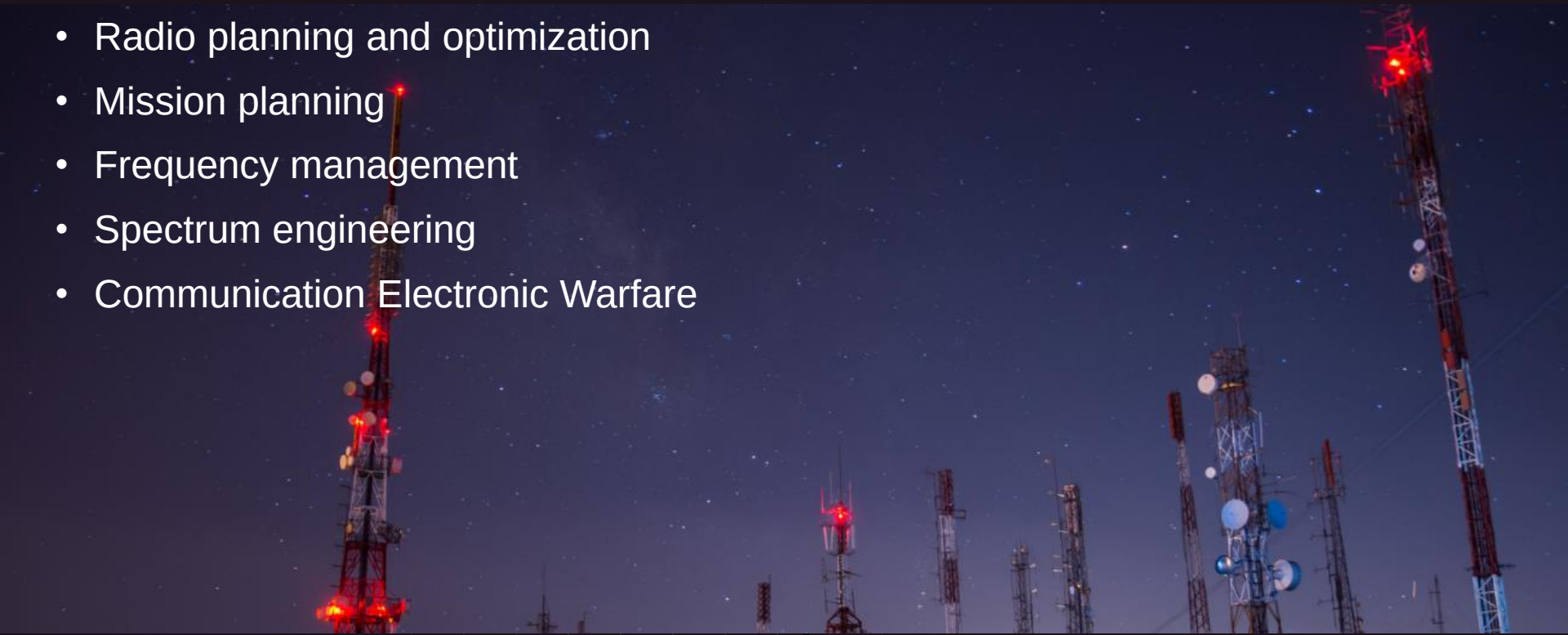
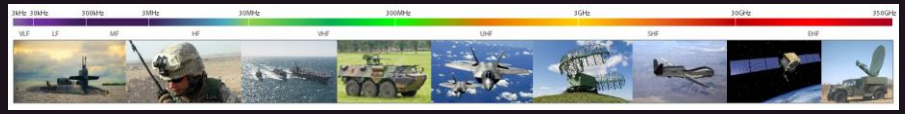


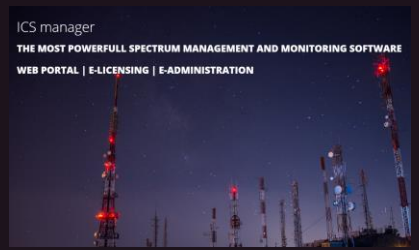
Fig. Architecture ICSM

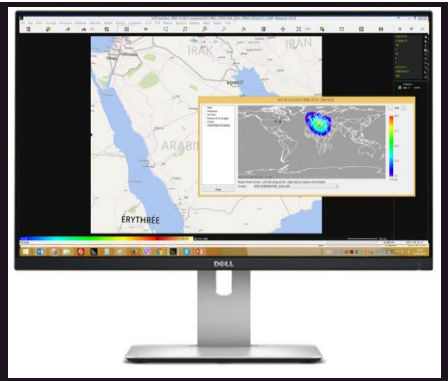
Automated Military Spectrum management and Electronic Warfare Systems

The ATDI's Automated Military Spectrum Management and Electronic Warfare Systems address staff at each level of command involved in Electromagnetic Spectrum Operations. The system aims to provide a unique and global solution for:

- Radio planning and optimization activities for all communication and transmission systems used by the Ground/Air/Sea/Space forces and/or civils
- Frequency management (FM)
- Spectrum management solution (SMS) for planning, coordinating and managing joint use of the EMS through operational, engineering and administrative procedures
- Electronic Warfare (EW) management / Interception and Intelligence







HTZ warfare - Key functions and capabilities

ATDI
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OVERVIEW

RADIO ENGINEERING

- Radio Planning and Optimisation
- Spectrum Engineering
- Interference Analysis & Frequency Assignment
- Host Nation & International coordination

ELECTRONIC WARFARE

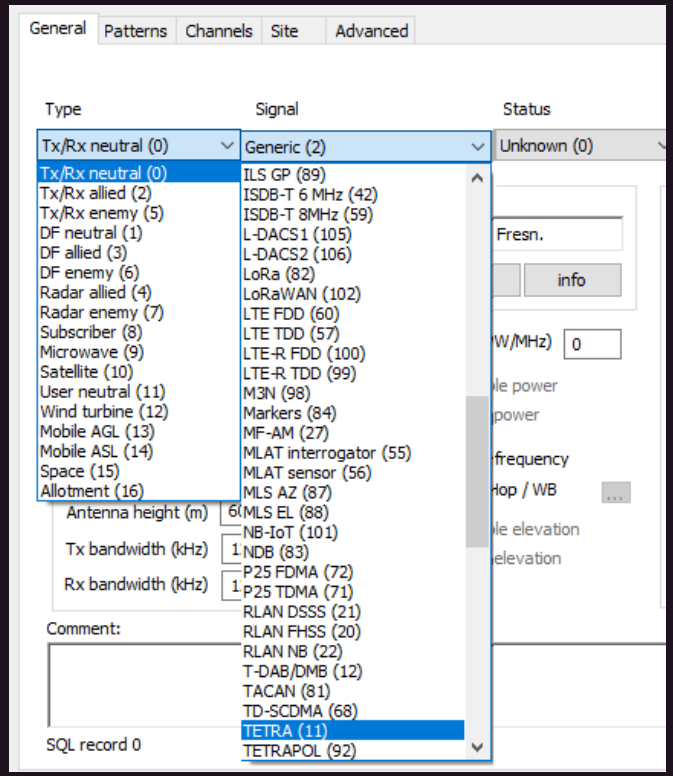
- Battelfield Communication Modelling
- Tactical Mission Planning
- On-The – Move Capabilities
- JAMMING
- LOCALIZATION (DF, SENSORS, MLAT,...)
- INTERCEPTION

Multitechnology tool

ADVANCED SPECTRUM SOFTWARE

Unique solution supporting all the technologies (from few kHz until 350 GHz) and covering the complete spectrum of services (from 10 kHz to 350 GHz) and standards, HTZ warfare enables the user to plan and optimize many analogue and digital technologies, including:

- **Broadcast :** Radio analog and digital (FM, AM, LF/MF, TDAB, etc.), TV analog and digital (DVB, DVB-T2, ISDB-T, DMR, DVB-S, DVBS2, etc.)
- **Radio cellular technologies:** GSM, GPRS, EDGE, EDGE Evolution PMR, Trunked Radio Systems (TETRA, TETRAPOL, APCO-25, MPT 1327), GSM-R, DCS, CDMA EVDO GPRS, Wi-Fi (802.11a/b/g/ac), WiMax (802.16 a/d/e), UMTS, R99, HSDPA, HSUPA, HSPA+, DB-HSDPA, DC-HSDPA, CDMA 2000 1x, CDMA 200 EV-DO, DCS, LTE Advanced (latest 3GPP release), MBSFN-LTE, NB-IoT (3GPP), IoT/LoRA/SigFox, WiFi, Ingenu, LoWPAN, RPMA, Zigbee, Enocean, ISA 100, LTE-M, LTE-R (TDD/FDD), ZWave, Mesh network, Smart Grid, CISCO smart grid technology, 5G-NR (FDD/TDD), SCADA,
- **Radio Critical Communication:** VHF/UHF, HF, LINK11, LINK16, TETRA, PMR, TETRAPOL , P25, DMR, CDMA, CDMA 2000, TEDS, PR4G, PS-LTE (Public Safety) , paging…
- **Satellite/Earth station**
- **Microwave-links & Point to Multi-Points**
- **Aeronautical & UAVs :** Communications (Ground To Ground/Ground To Air), Radio Navigation (GP, markers, Loc, MLAT, DME, TACAN, NDB, Markers, GBAS RX, MLS AZ, etc.) and Surveillance systems, drones
- **Radio-localisation:** (DF/Sensors/MLAT, Telemetry, TDOA, RSSI, etc.)
- **Jammers** (Fixed frequency mode, **wide band – diffusion , wide band – adaptive mode)**
- **Subscribers and User Equipment**



Key features

Spectrum Management (for both civil and military systems)

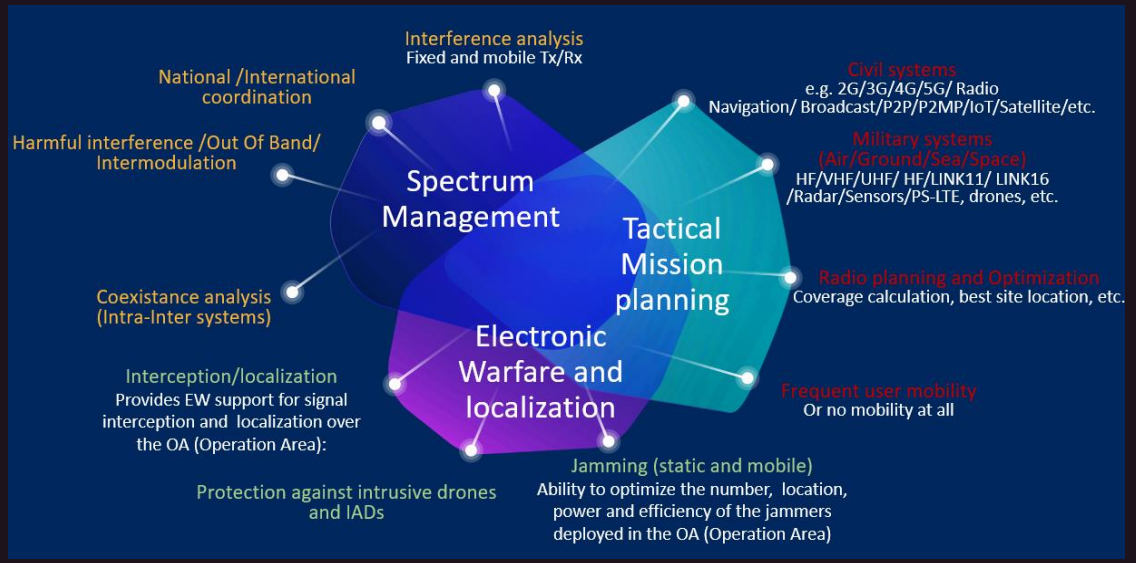
Planning, coordinating, and managing of joint use of the electromagnetic spectrum. Evaluating and mitigating electromagnetic environmental effects, managing frequency records and databases, frequency assignment, de-conflicting frequencies, frequency interference mitigation, etc.

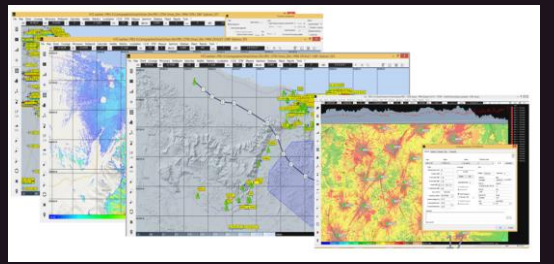
Tactical Mission Planning

Planning, coordinating, and managing military systems (HF, VHF/UHF, Radar, Airborne, UAV, ships, etc.) for tactical and/or temporary missions

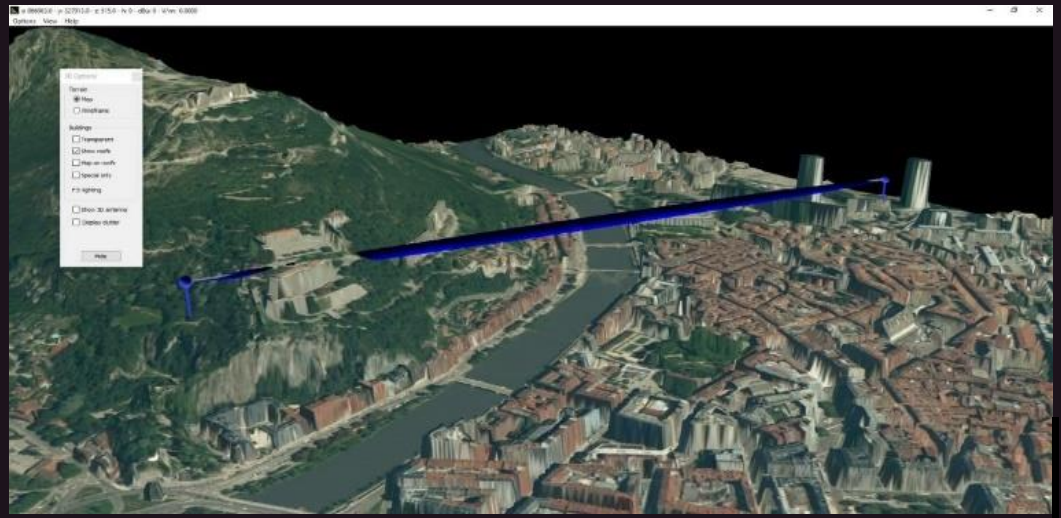
Electronic Warfare and localization

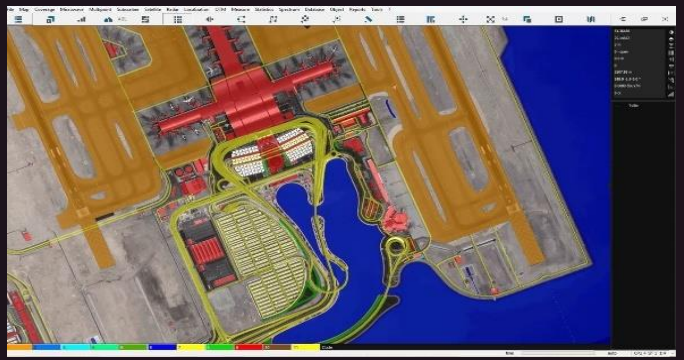
Ensure electromagnetic superiority through COMINT/ELINT, localization (DF, sensors, etc.) technics

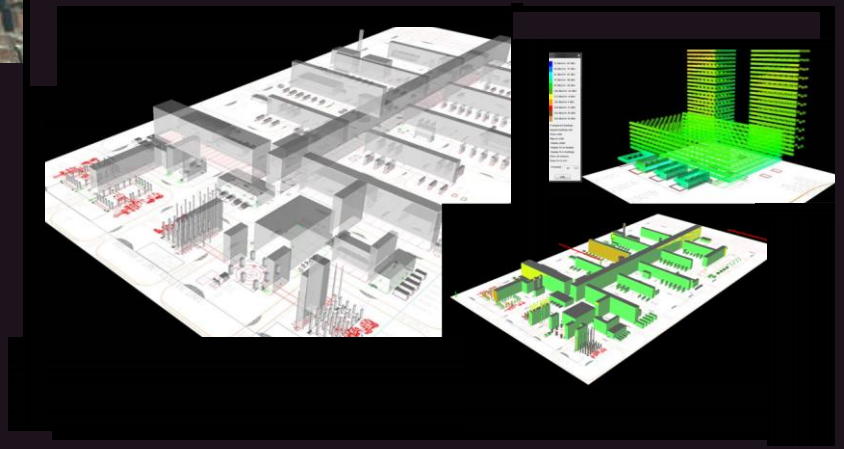




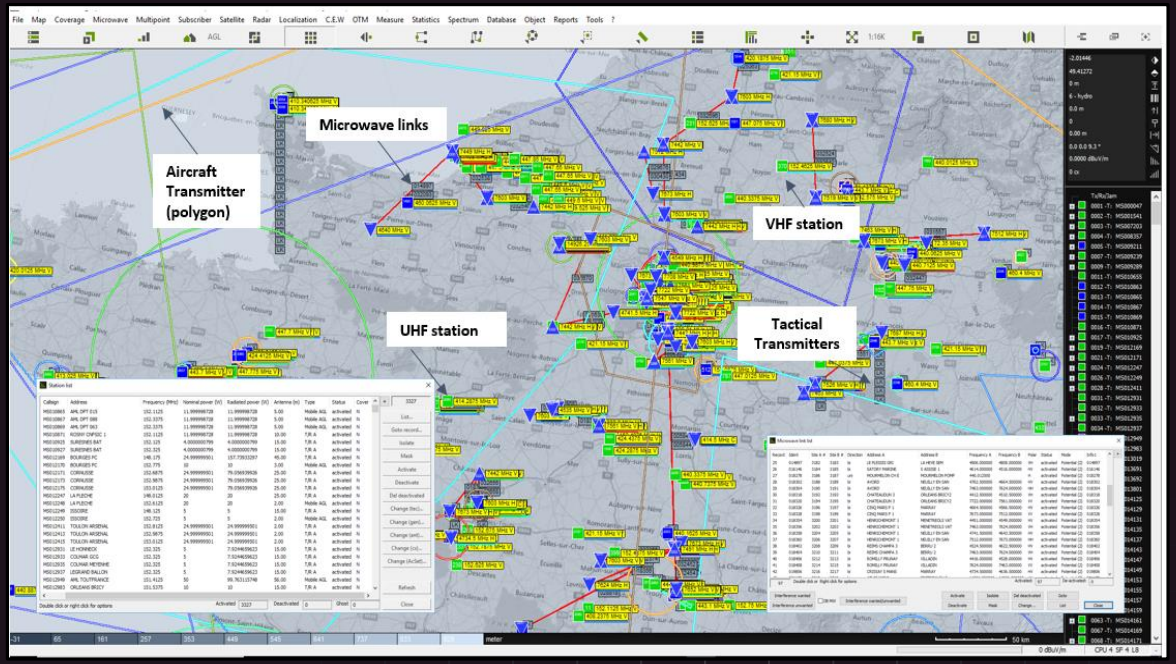
Dynamic 3D Engine

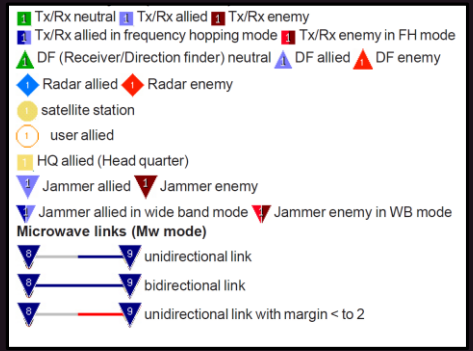


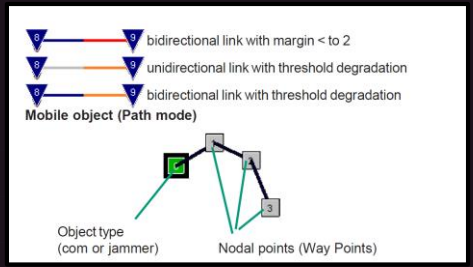




Network and mission planning







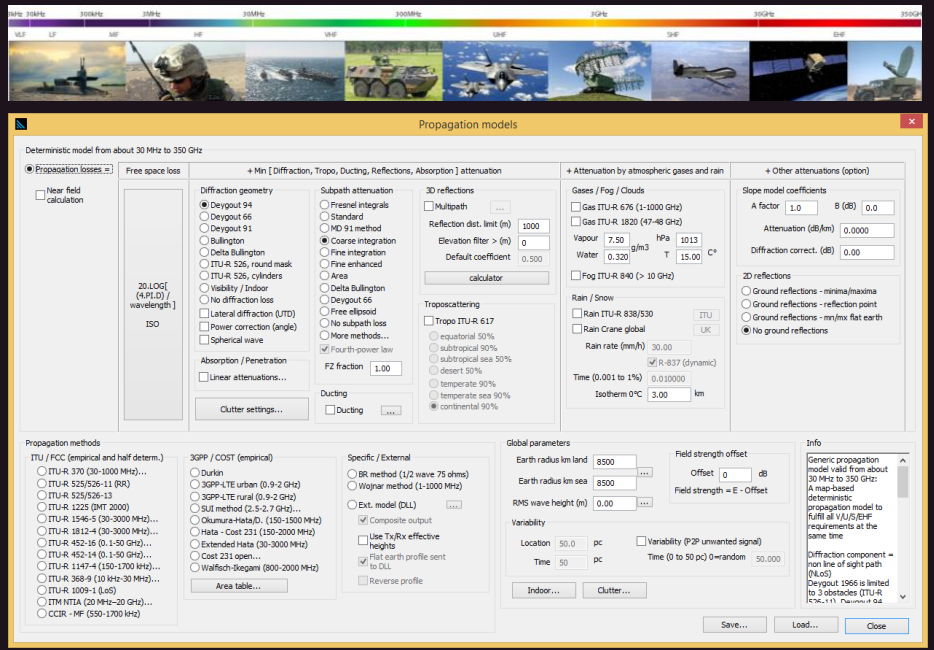
Graphical user interface (GUI), the user profile and information access adapted to each task force

Fast calculation Interference analysis/Frequency assignments/ Engineering calculations

Propagation models

The behavior and coverage of radio-frequency signals are predicted employing some mathematical and physical rules, known as propagation models. HTZ warfare provides a comprehensive set of propagation models, both empirical and geometrical. Moreover, custom models (in-house models) can be integrated as DLL file.

The engineering functionality covers all radio services throughout the whole radio spectrum along with over fitty propagation models ranging from VLF to EHF (3kHz – 350GHz):



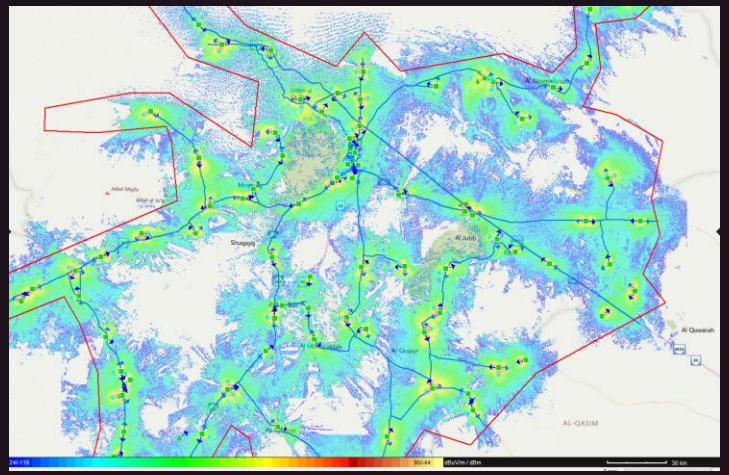
ITU-R P.370-7, ITU-R P.525, ITU-R P.452-14, ITU-R P.617-5, ITU-R P.676-11, ITU-R P.840-7, ITU-R P.838-3, ITU-R P.530-17, COST 231, ITU-T G.826, ITU-R F.1397, ITU-R F.1491, Models for Ground, maritime, high altitude communications, based on IF-77/ITU-R.P528, HF skywave, Ground wave, Fresnel method, Bullington method, Epstein-Peterson Method, Edwards and Durkin Method, Deygout Method, ITU-R P.526 Model, HF Sky wave ITU – R P.533, ..

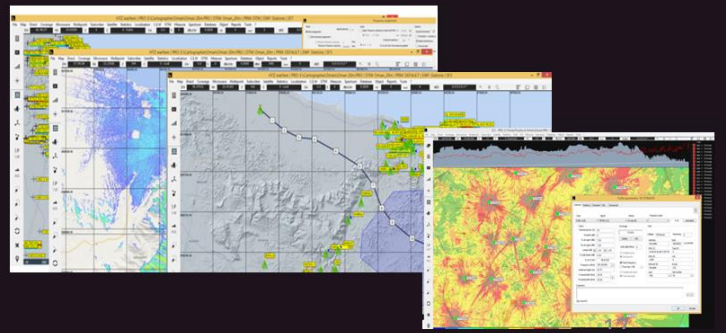
For any service operating from 10 kHz to 350 GHz, either on land, sea or in the air

Radio Critical Communication

TETRA, P25, DMR, CDMA, CDMA 2000, TEDS, TETRAPOL, PS-LTE, VHF/UHF…

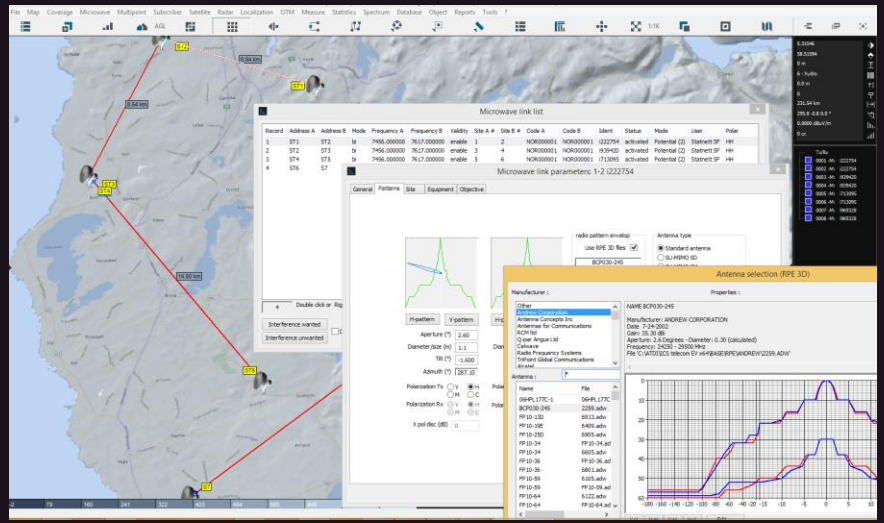
- DL/UL Coverage planning (outdoor, indoor , incar)
- DL/UL link budget calculator
- Automatic best site selection candidates according to coverage objective
- Automatic site planning
- Automatic site optimization (azimuth, power, tilt, antenna model…)
- Interference calculations
- Automatic Frequency assignment
- Traffic & mobility profile editor (UE)
- Capacity planning (Erlang, Data)
- Automated handover, neighbor list planning
- Monte Carlo simulations

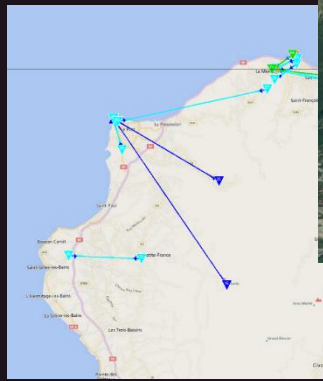


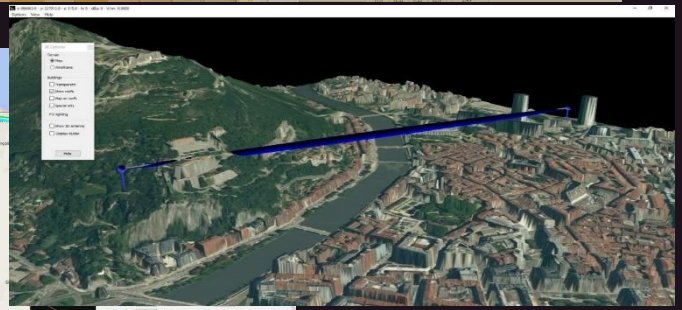


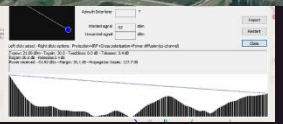
Microwave link, P2MP, Backhaul, mmW bands

- Profile budget calculations
- Frequency and space diversity
- Multi-K factor calculations
- Climate and rain parameters
- Reliability calculations
- Automatic antenna orientation
- Link optimization
- Automated frequency planning
- Interference calculations
- Quality objectives calculations (ITU-R F. 1703 and ITU-T G.827)
- MIMO Antenna systems
- M2M, D2D, SCADA, CDMA 450, MMDS, WiMAX, LMDS, etc.





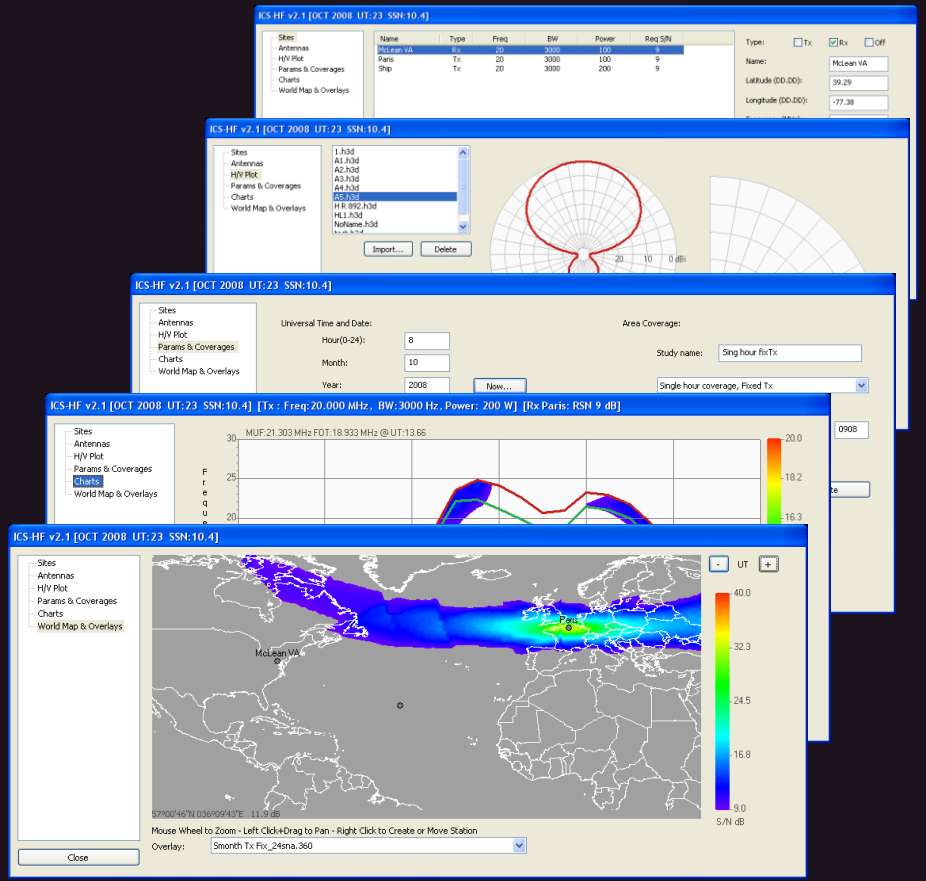




HF planning

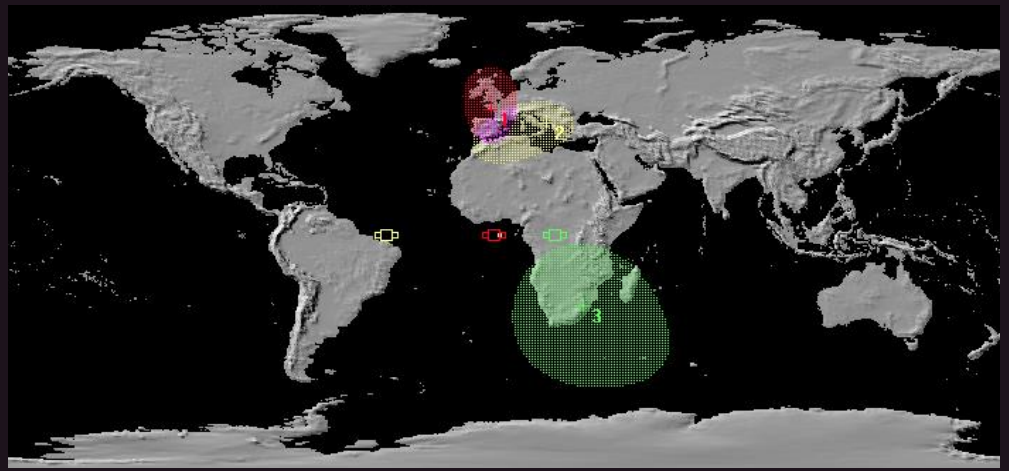
MODE	EQUIPMENT
SINGLE HOUR COVERAGE	FIXED TRANSMITTER
	MOBILE TRANSMITTER
SINGLE MONTH 24h COVERAGE	FIXED TRANSMITTER
	MOBILE TRANSMITTER

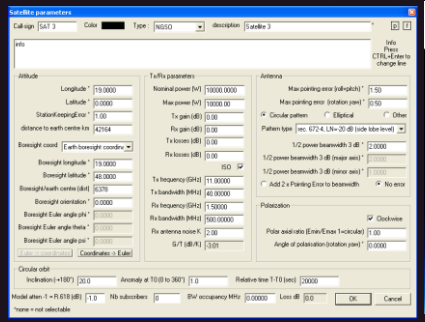
CHART ANALYSIS
MUF (Maximum Usable Frequency)
FOT (Frequency of Optimal Transmission)



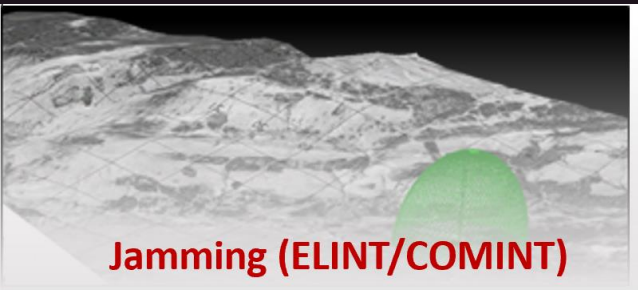
Satellites

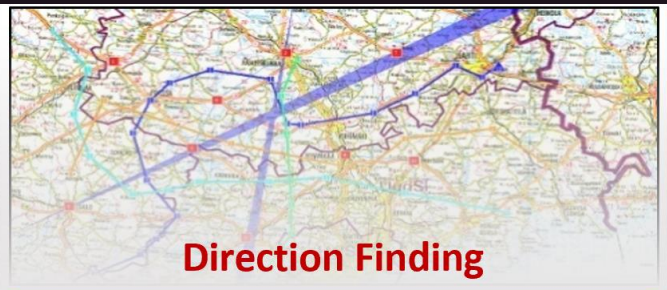
- GSO/non-GSO satellite coverage planning and link budget (EIRP, G/T, C/N)
- Wide-beam and HTS beam planning across all satellite frequency bands
- Automated frequency planning
- GSO vs GSO and GSO vs non-GSO interference analysis (ΔT/T, C/I, PFD and EPFD masks)
- Satellite vs terrestrial co-existence analysis /Earth station coordination (ITU APP 7)
- DTH network planning /VSAT network planning and optimization
- Covers all satellite services: FSS, BSS, MSS, Earth-exploration, meteorological and more

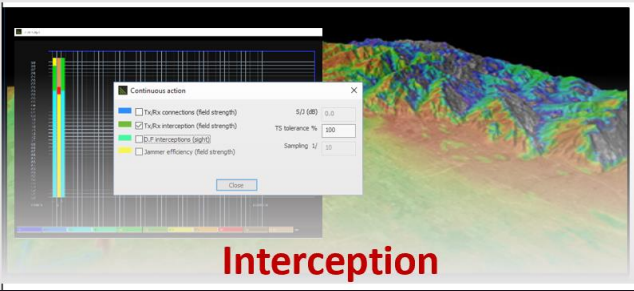


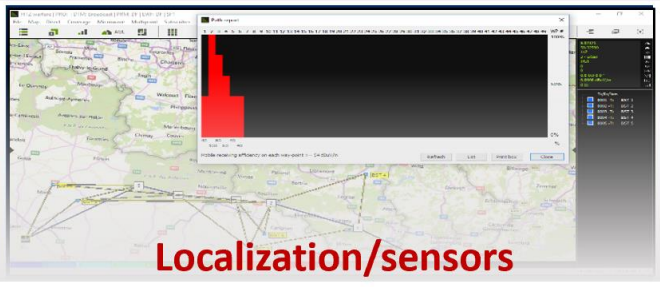


Electronic warfare



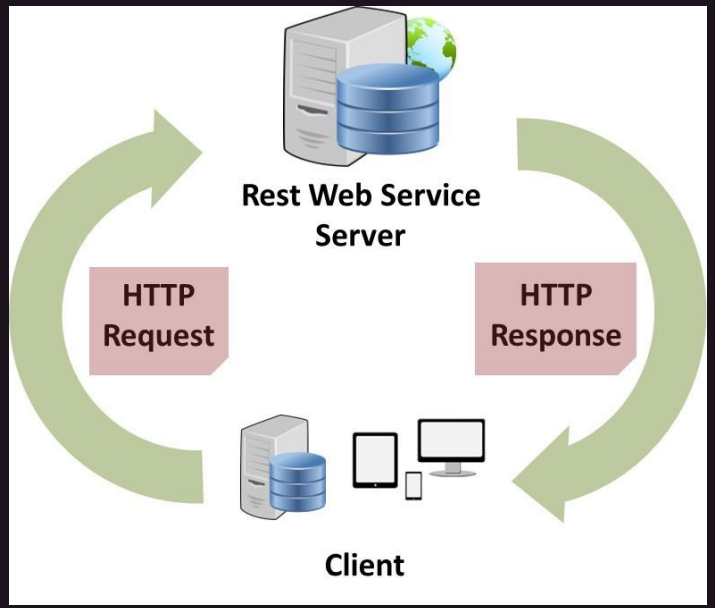




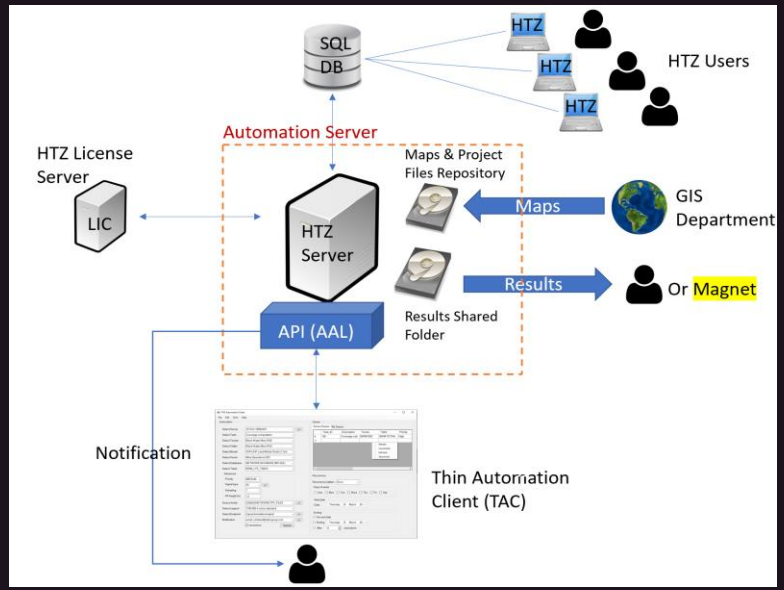


Use HTZ warfare for the preparation of military missions like electronic war (campaigns, operation, optimization of flight path for drones, site searching for direction finders or jammers…) and/or in the debriefing of these missions (recovery and analysis of the recorded data and validation of the past missions)

HTZ RESTFUL API



Sample deployment scenario



HTZ Server

- Running HTZ software
- Running HTZ API server
- Access to existing network license
- Copy of all terrain/clutter/PRM/Legends
- Access to SQL database

ICS MANAGER - THE MOST POWERFULL SPECTRUM MANAGEMENT AND MONITORING SOFTWARE

Fig. Architecture ICSM

Administrative and technical spectrum management modules

The global Spectrum Management solution is shaped by two main applications inter-connected together:

- **ICS Manager Warfare Edition** (Administrative Spectrum management Module) :

  Handling all the administrative processes of the spectrum Management (licensing, coordination, notification, etc.). ICS manager is the backbone of a regulator's spectrum management division

- **HTZ warfare** (Technical Spectrum Engineering Module (SEM):
  Radio planning and spectrum engineering software for electronic warfare and tactical communications

-> ICS manager manages the database related to spectrum management (frequency plan, band allocation, equipment, list of transmitters, administrative information related to the license, users, etc..) while HTZ warfare manages technical studies and calculations such as frequency assignments, electromagnetic compatibility, interferences, etc...

Exchange data between ICS manager and HTZ warfare

ADVANCED SPECTRUM SOFTWARE

Dynamic Spectrum Allocation

Interface with third applications/systems (i.e. Sensors, surveillance cameras, Tracking systems ...)

Contraints & inspection

Frequency Authorization Process

Intranet Portal Online data entry

Interface to radio Radio monitoring (R&S,TCI, Thales,...)

systems (R&S, Thales, TCI...)

Spectrum management modules

BRIFIC /SRS (ITU External database) & NATO data exchange

CENTRAL DATABASE (Military & civil

- Equipement database
- Antenna database,
- Site database;
- Chanelling plans;
- Frequency bands

ICS manager

automated spectrum mananagement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