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VIRTUAL TEST RANGE

Virtual Test Range is a software package that runs in PCs (Windows® 95, 98, ME, 2000, XP and NT-4), capable of simulating in real time the operations of Search Radar, Tracking radar, Fire Control Systems and Missile Systems (both RF and IR types), in competition against targets, against natural interferences and against the most used and most advanced Electronic Warfare techniques.

VTR is a friendly, realistic, accurate and reliable software and therefore is a perfect tool to perform unbiased analysis, evaluations and comparisons of different designs and different systems.

VTR, already in use in many industrial and governmental organisations of more than ten countries, is very easy to operate: by introducing the parameters characterising a system, VTR allows to verify if they are adequate to the operational needs that must be reached, thanks to its ability to simulate, in a virtual way, so many real situations as it could happen in a real Test Range: with the advantage of being able to repeat the tests as many times as necessary, and with the opportunity to analyse in real time the parameters that led to certain results. In this way, the time to be spent in a real test range can be reduced, allowing significant cost and time savings in system evaluations.

The fidelity of the simulation is such that it can also be used as a basic training tool for personnel in charge of real operations. In fact, since VTR files define the radar or the weapon system of interest, the targets, the operational environment and, above all, the EW systems against which the weapon must compete, thanks to the help of a not scenic but essential graphics, the operator can practice to face difficult situations. Consequently he will be more prepared in facing the real difficult operational situations. The simulation runs can be pre-programmed by means of a very useful tool: the mission planning, where it is possible to establish the targets courses and the activation of the various options.



RADAR TYPES

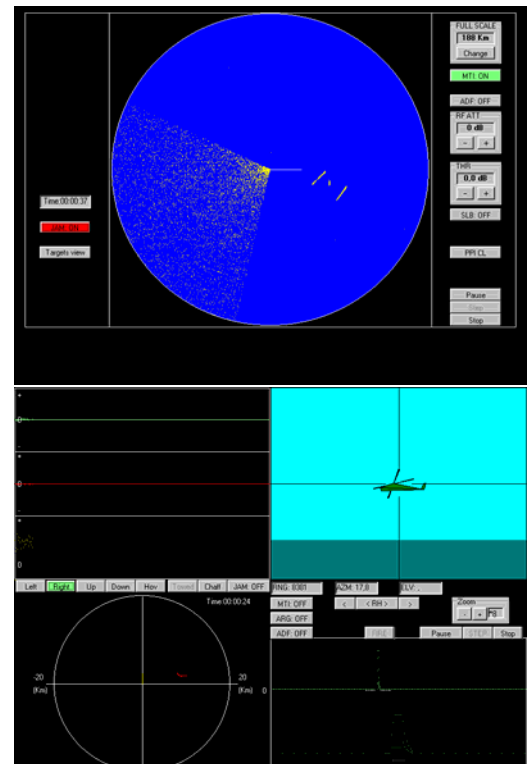
Practically, VTR allows the simulation of any type of radar:

Search radar

- Traditional Simple radar
- Track while scan (TWS) radar
- Pulse compression (MOP) radar
- With or without MTI filter
- STC/FTC
- Simple or squared cosecant antenna
- Simple or CFAR receiver (Autogate)
- Hard limited receiver or not
- Automatic extractor or not

Fire-Control Radar

- Conical Scan radar
- Monopulse radar
- Simple pulse or pulse compression radar
- Pulse Doppler radar
- With or without MTI
- With or without Anti Range Gate Stealer
- Linear (AGC) or Logarithmic receiver
- Frequency Agility or not



MISSILE SYSTEMS

VTR performs the simulation and animations relevant to:

- SAM
- ASM
- AAM
- SS-N

with the following guidance system

Command (CLOS, with normal or “lead” guidance), **Active**, **Semi-active** and **Infra-Red. IR missile seekers** can be of “conical scan” type or “Rosette Scan” type.

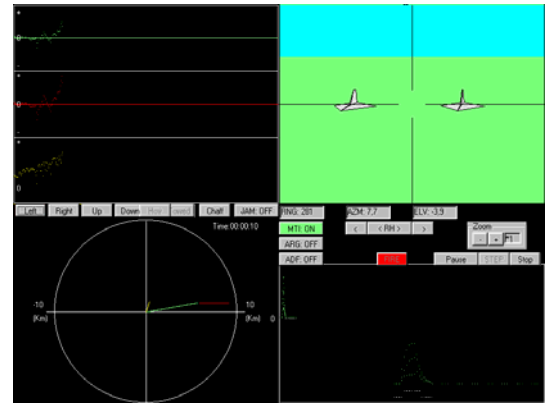
TARGETS / ENVIRONMENT

Targets can be aircraft, helicopters, ships, tanks and missiles.

All targets can be simulated as point-like or as complex targets composed by many elementary scatters capable of generating both **amplitude scintillation** and **angular glint**.

The target RCS or IR signature are weighted (or not) in accordance with the aspect angle.

Ground, sea and rain clutter are simulated, as well as the propagation attenuation, spherical earth and multipath.



ECM / ECCM

VTR can simulate the effectiveness of both **Self Protection Jammers** and **Stand-Off Jammers**. Many ECM techniques can be programmed in details, like: Chaff, Noise, Coherent Noise, Swept CW, Multiple False Targets, Anti coded waveforms, Anti CFAR, Range Gate Pull Off, Velocity Gate Pull Off, Amplitude Modulation, Cross Polarisation, Angular Blinking. These techniques can be used or stand alone or combined in Jamming Programs.

VTR also simulates the performances of Airborne Expendable Decoys, Naval Expendable Decoys and **Towed Decoys** both of “Repeater” and “Fiber Optic” types. VTR32-C can also simulate **Cross Eye Jamming** techniques.

The main specific **ECCMs** available are: Frequency agility, Side Lobe Blanking and Anti Range Gate Stealer.

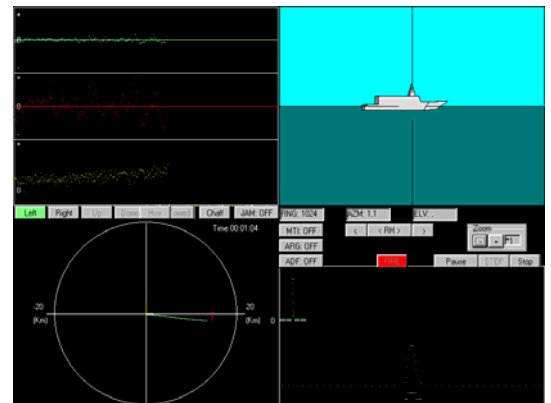
Against IR threats, VTR can simulate both IR lamps and Flares, launched according to the programmed sequences.

VTR OUTPUTS

Besides the real time presentations (PPI, A/R displays, recorder, map, etc.), several **Scientific Graphs** can be plotted and printed out, as well as the complete list of the system parameters and system description, all with their file name and time. The scientific graphs are relevant to:

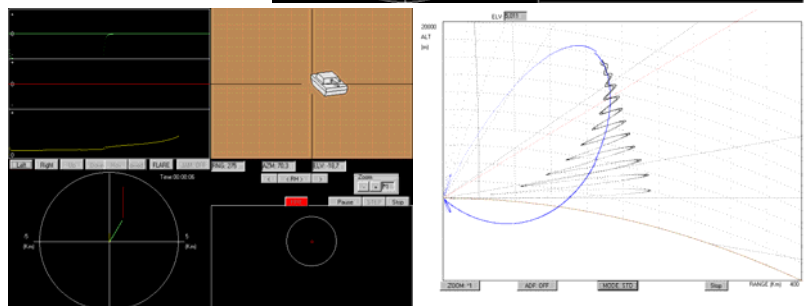
Radar performances

- Radar Coverage
 - Free space
 - Real environment (with multipath and spherical earth).
- Constant Height Graphs :
 - Signal to noise ratio
 - Clutter to noise ratio
 - Jammer to noise ratio
 - Range Advance Factor



Tracking systems check

- Antenna/telescope Patterns
- Range error slope
- Angular error slope
- AGC step response
- Range Loop step response
- Angular Loop step response



Text file

At the end of each run a “LOG” .txt file, relevant to more than 100 functions stored during the simulation run, is generated, to be exported and used to create any type of post run analysis (statistics, graphs, etc.).