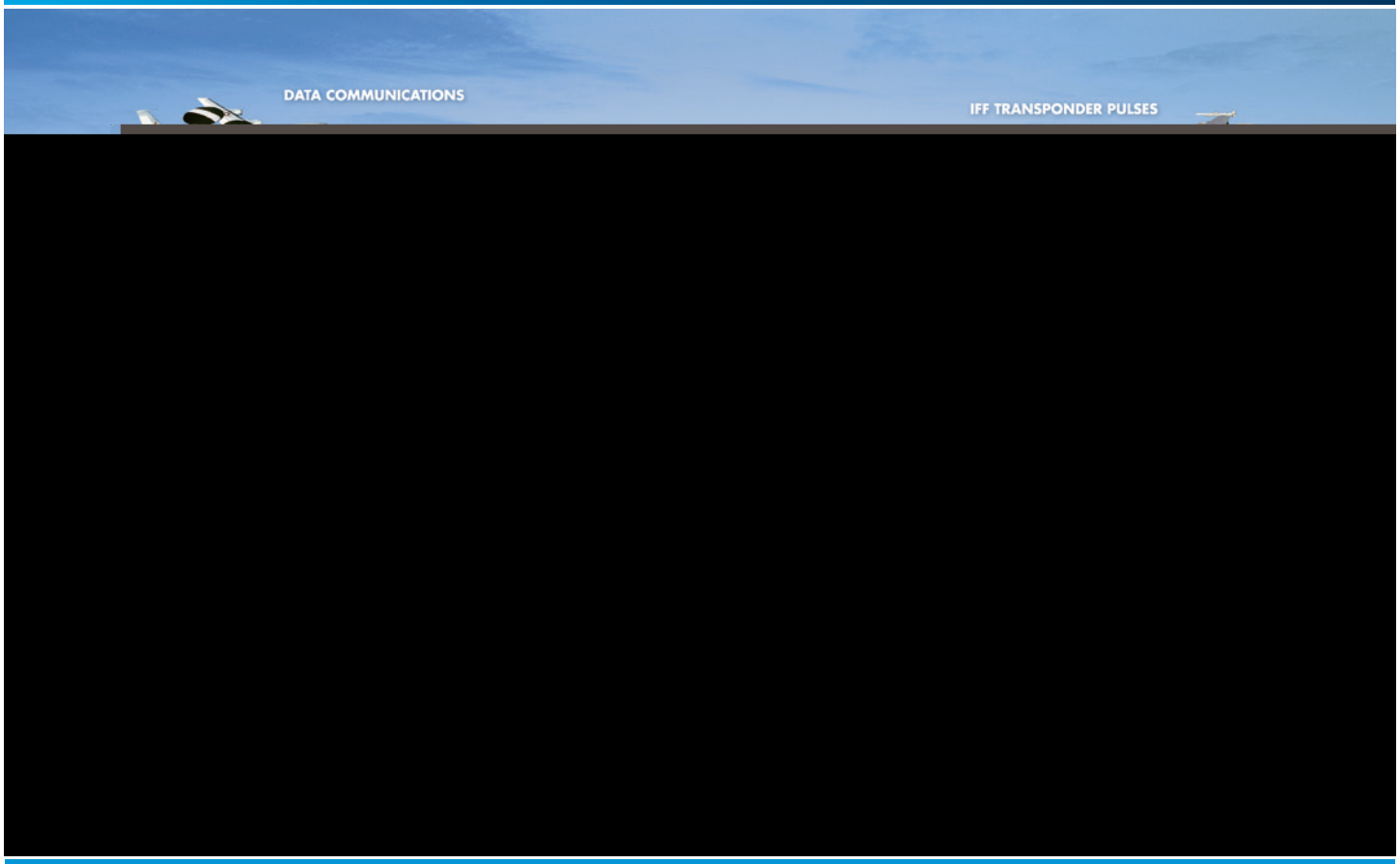
RF Signal Environment Generation

Testing Sophisticated Communications Systems



ENSURE BETTER COMMUNICATIONS SYSTEM PERFORMANCE AND DEVELOPMENT SAVINGS WITH REALISTIC RF SIGNAL ENVIRONMENT GENERATION

COMPLEX RF SIGNAL GENERATION

As he orld's RF signal en ironmen gro s increasingl comple and di erse, oda 's comm nica ions s s ems m s be able o perform in he mids of e reme signal dep h and di ersi . Wi h Viasa 's RF Signal En ironmen Genera ion, o can ens re o r comm nica ions s s ems are read for he real orld before opera ional deplo men . O r RF Signal En ironmen Genera ion goes be ond ordinar sim la ion o ac all crea e a r e- o-life a ionics en ironmen i h signals of RF energ beha ing in a realis ic manner.

REPEATABLE

Viasa 's RF Signal En ironmen Genera ion crea es real life RF signal ac i in a repea able en ironmen o es comm nica ions s s ems and nco er design iss es earl . This real- orld en ironmen enables o o reso e iss es before o r firs fligh es , so o can:

- Sa e millions of dollars in de elopmen , fligh es and deplo men cos s
- Speed ime o marke
- Op imi e s s em performance
- Red ce deplo men risks

SCALABLE

Viasa can ailor he RF Signal En ironmen Genera ion echnolog o mee o r niq e es req iremen s. O r s s ems are scalable and programmable sing a fle ible and po erf l ser in erface.

LARGE EXISTING SIGNAL LIBRARY

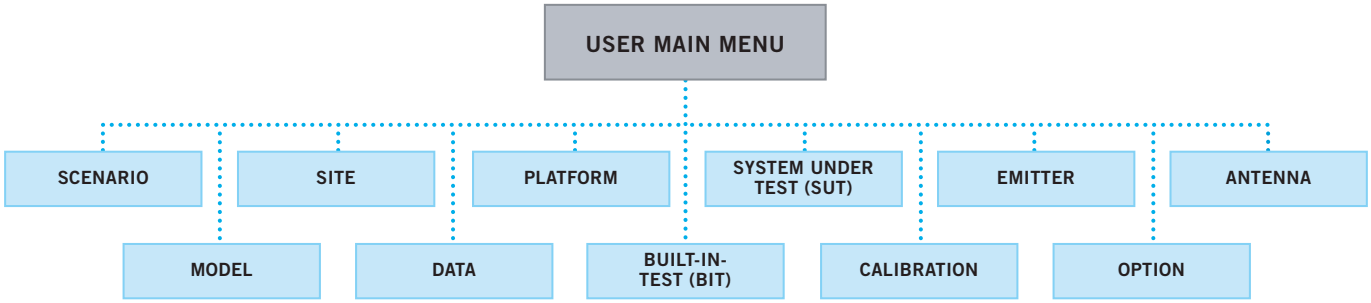
Viasa offers a large librar of e er 100 signals for real-is ic en ironmen genera ion, as ell as c s om signals for o r specific needs. We are con in all e panding o r a eform librar o enhance he fideli of es ing in modern mili ar and commercial en ironmen s.

- **Realistic Signal Environment** A simulated environment generating real RF
- **High-Density Signal Environment** Hundreds of independent signals
- **Dynamic RF Environment** Independent signal behavior
- **Behavioral Emitter Models** Coherent signals that react to the environment
- **Independent Platform Motion** 6 DOF motion models
- **Independent Signal Control** Frequency, amplitude, delay, Doppler, pulse characteristics, and more…

RF SIGNAL GENERATION EXPERIENCE

For o er 20 ears, s s ems designers ha e relied on Viasa 's signal modeling e per ise o help s ccessf ll la nch be er a ionics and comm nica ions s s ems. O r RF Signal E ironmen Genera ion can shake o design problems d ring de elopmen al es ing in a r e- o-life e ironmen . Signal scenarios are con rolled, repea able and d namic o help o op imi e o r s s em's performance. Viasa has deli ered large-scale s s ems for pla forms incl ding he F-22 and F-35.

BUILDING AN RF SIGNAL ENVIRONMENT GENERATION SCENARIO



Adj s and con rol e er aspec of he RF e ironmen genera io ia he s s em's in i i e ser in erface.

Begin b defining he ph sical loca ion of he desired RF e ironmen . The scenario can be a an geographic loca ion in he orld. The s s em ses a Defense Terrain/Ele a ion Da abase (DTED) o pro ide real- orld opograph . Yo can hen place s a ic or d namic pla forms (objec s) in he scenario.

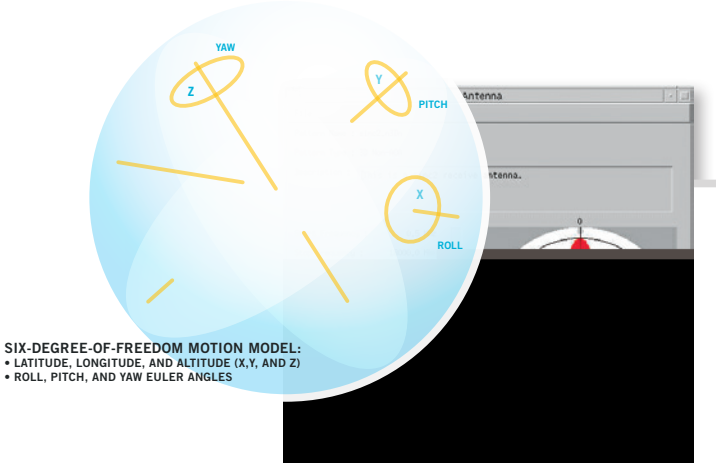
D namic mo ion can be es ablished hro gh se eloci parame ers o ia a poin defini ion. Comp a ion of d namic pla form posi ion ses a si degrees of freedom (6-DOF) mo ion model ha racks bo h posi ion and al i de of he pla form i h pda e ra es as high as 100 H .

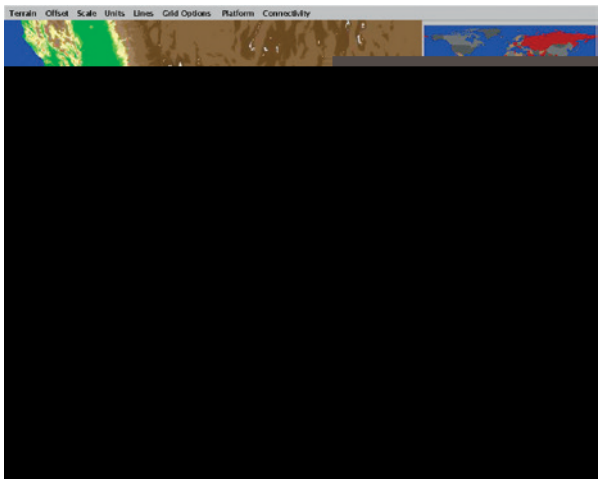
Ne , o can add emi ers o he pla forms, defining all he ransmi ed signals from he real- orld objec s. The ser in erface enables o o selec from a se of emi er mod la ion pes and also associa e an an enna pa ern i h he emi er. The an enna pa erns can be selec ed from o r predefined da a base or impor ed o represen c s om an ennas in a high-fideli gain pa ern modeled b an a im h and ele a ion look- p able.

Pla form and emi er models can be replica ed hro gho he scenario o crea e a high-densi , real- orld RF e ironmen . The s s em s ppor s predefined pla form models ha represen real- orld objec s s ch as an air defense ne ork. The echnolog offers emi er beha ioral models, changing modes, rning ransmissions on and off, and se ing fi ed po er le els a specified imes.

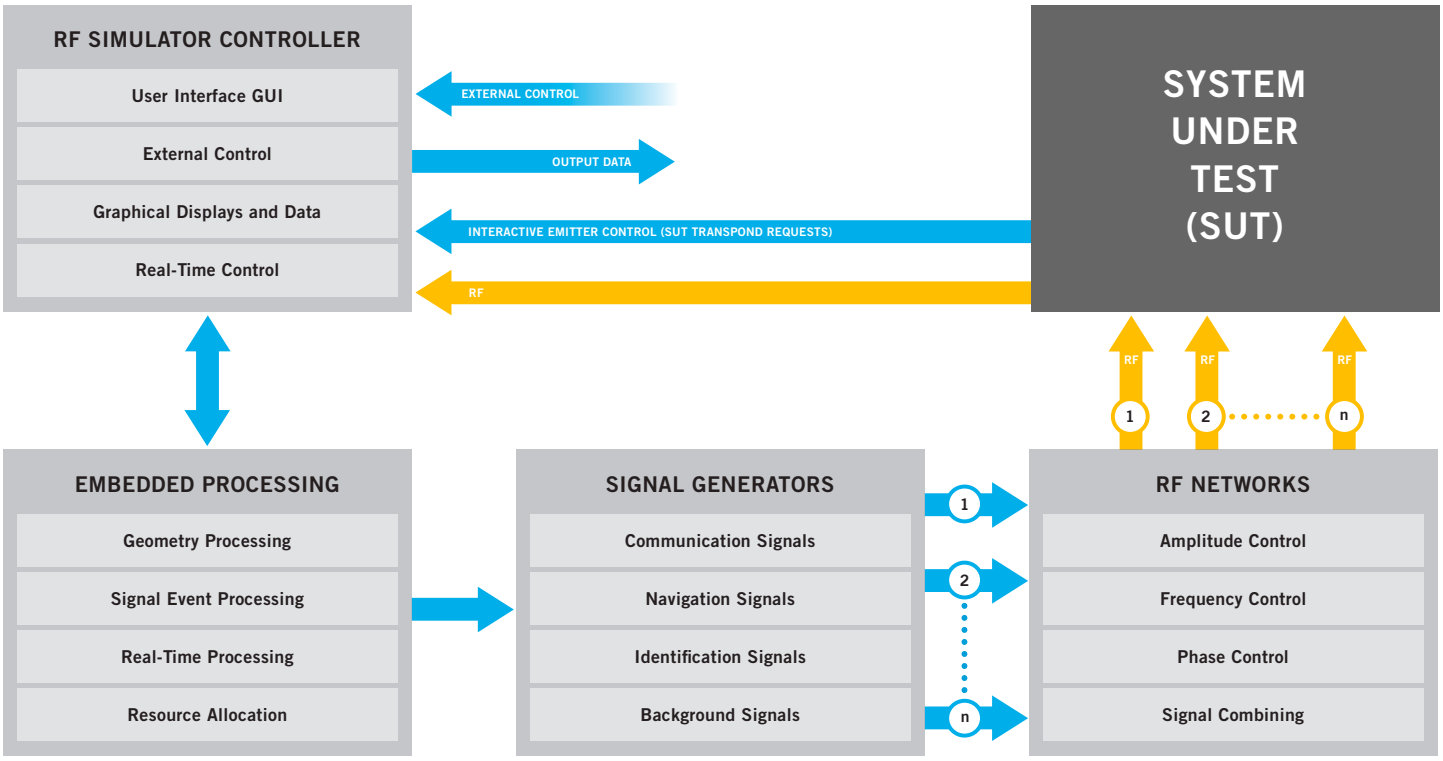
The S s em Under Tes (SUT) is also defined sing emi er and an enna models. The SUT can be ei her s a ic or d namic sing he 6-DOF mo ion models. Yo can also impor de ailed an enna models ha reflec he niq e fea res of o r comm nica ion s s em. For comple s s ems, his can incl de m l iple an enna pa erns ha feed in o m l iple sensors on a specific pla form.

D ring r n ime, he s s em genera es he correc ampli de, freq enc and p lse charac eris ics for each ransmi ed signal of each pla form. For a SUT i h in erferome er sensors, acc ra e signal phase is also presen ed o each an enna por . The opera or has he fle ibili o s op and res me a scenario, as ell as o make d namic changes o pla forms and emi ers d ring r n ime. This i ir al e ironmen em la es he real- orld RF e ironmen o he SUT i h a high degree of fideli , fle ibili and repea abili .





Viasat RF Signal Environment Generation



RF SIGNAL ENVIRONMENT GENERATION ARCHITECTURE FOR YOUR SPECIFIC NEEDS

Viasa s RF signal genera ion echnolog pro ides a ma re de elopmen en ironmen for c s om ser req iremen s. We offer engineered- o-order s s ems, i h c s omer-dri en req iremen s for signal pes, processing hro ghp , in erfaces o o her s s ems, q an i ies of signal genera ion elemen s and RF ne orks and o p por s. O r archi ec re facili a es scalabili and e ensions o he e is ing s im la or signal se and f nc ionali . The RF S im la or Con roller hos s he Graphical User In erface (GUI) for scenario de elopmen , da a s orage and displa and real- ime scenario con rol.

Embedded processors perform he comp a ionall in ensi e asks of pla form mo ion and geome r calc la ions be een he scenario pla forms and he SUT. The embedded processing componen s also keep he iming for signals and con rol he parame ers for he programmable signal genera ors.

The signal genera ion ses a niq e arbi rar a eform genera or s bs s em o em la e a ide u arie of p lsed and con in o s RF a eforms. The signal genera ors o p he a eforms a baseband i h ra es as high as 40 Megasamples/second. Viasa offers a large librar of o er 100 signals for realis ic en ironmen sim la ion. Viasa 's e perienced signal modeling eam can also le erage o r fle ible s im la ion archi ec re o de elop addi ional a eforms for o r needs.

Viasa 's RF signal genera ion archi ec re pro ides a scalable and fle ible es and e al a ion en ironmen for o r comm nica ions s s em. Using he baseband signals, RF ne orks adj s he ampli de, freq enc and phase of he signals based on he geome r , range and an enna charac eris ics of he pla forms and he SUT. The echnolog s ppor s signal genera ion from as lo as 500 kH p o as high as 18 GH . Freq enc is con rollable in 1 H incremen s. As he comm nica ions s s em designer, o can de ermine he n mber of signal genera ors based on he req ired signal densi of he real- orld applica ion. M l iple emi er signals are combined o presen a composi e signal o he SUT. Yo can also specif he n mber of RF o p por s, hich correla es o he n mber of inp an enna por s needed o s im la e he SUT. The phase con rol of he signal allo s direc ional sensing from an in erferome er o an acc rac of one degree.

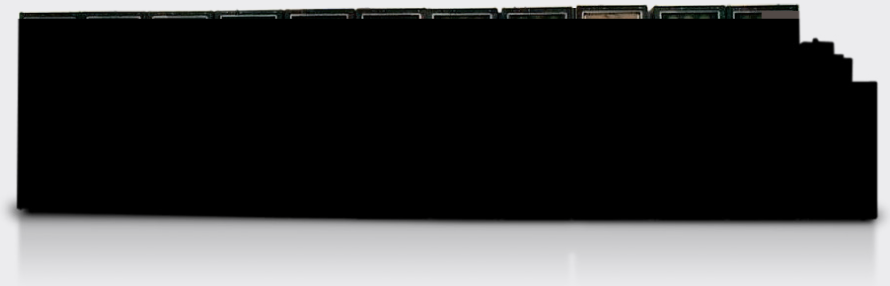
The ph sical config ra ion of he s s em is highl dependen on he specific c s omer req iremen s for signal densi and comm nica ions s s em comple i . Viasa has deli ered c s omi ed s s ems in man forms, ranging from a one-de ice s s em o o er a do en racks. We con in e o de elop smaller and more mod lar s im la ors ha promise addi ional fle ibili for o r needs.

Tes ing i h Viasa s RF Signal En ironmen Genera ion red ces ne s s em cos s b lo ering he probabili and risks of disco ering and fi ing design problems af er fielding a comm nica ions s s em.

Viasat RF Signal Environment Generation

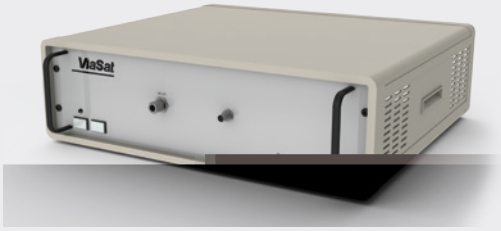
The Viasa RF S im la ion engineering eam is commi ed o helping o s ccessf ll design and la nch o r comple comm nica ions s s em. We deli er he highes q ali RF s im la ors for o r comm nica ions s s em es ing needs, o help o gain sa ings in ime and de elopmen cos s, hile ens ring op imal s s em performance.

LARGE-SCALE RF ENVIRONMENT GENERATOR



PORTABLE RF SIGNAL ENVIRONMENT GENERATOR

VRG-1000 PORTABLE IFF ENVIRONMENT GENERATOR



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