L3’s VistaTEC™ is a state-of-the-art application used to set-up and control many of the L3 Data Acquisition Systems (DAS).

L3 T&RF has taken its premier standard products and experience of delivering unique totally integrated aircraft flight test systems to build this new generation, hardware-independent platform. The Vista components supplied to a particular customer, though, are based upon the requirements of that customer, thus minimizing acquisition costs. Additional Vista components can be added at any time as the customer’s data acquisition or processing requirements change.

Vista is developed in the Java object-oriented language and utilizes an industry standard middle ware database and real-time graphics applications to ensure platform independence. Thus one database contains all the information required to set up the airborne equipment and ground station without the requirement for translators. Operators need to be familiar with only a single look-and-feel Graphical User Interface (GUI) to control all hardware elements. A single application product means that the customer only needs to learn how to operate one application suite for all its hardware products.

Vista may be looked upon as a container holding multiple data acquisition, telemetry, and avionics bus application. Users will select only those plug-in software modules needed to meet application requirements. Standard plug-in functions are listed on the next page.

**FEATURES**

- Vista™ provides an integrated solution for airborne data acquisition and encoding to ground support units and ground station systems.
- VistaTEC™ enhancement provides Hardware Configuration, Measurement, Frame Format and Real-time Display Subsystems.
- Measurement Subsystem consolidates all aspects of a measurement channel & supports all TMATS measurement definition attributes.
- Contains extensive import capability for avionics data bus support to allow information to be “cherry-picked” from a data bus.
- Frame Format Subsystem allows the user to define the frame manually or automatically with the Frame Format Auto Populator.
- Support for CVSD Voice and JPEG-2000 encoding and decoding.
VISTATEC™
TELEMETRY EQUIPMENT CONFIGURATION

OVERVIEW

STANDARD FUNCTIONS
- Measurement Definition Management
- Relational Database
- Airborne Hardware Setup
- Project Manager
- Avionics Bus Management and Analysis
- Calibration Analysis
- Automatic Telemetry Frame Format Population
- Ground Hardware Setup and Control - Ground Systems and Telemetry Receivers
- Alarm Detection and Event Reporting and Logging
- Real-Time Data Archiving
- Real-Time Algorithm Processing
- Software Packet and Frame Decommutator
- Real-Time Displays
- Data Distribution
- Applications Programming Interface (API / SDK)
- Post-Processing Application (e.g., Matlab) Interface
- Operational Checkout

Vista is compatible with Microsoft Windows® and Linux® platforms.

PROJECT MANAGER

The Project Manager is a Vista plug-in that is used to configure and control the available air and ground hardware modules. A module concept is used to manage hardware items. The air hardware module is the entire airborne data acquisition and transmission system. Ground hardware modules consist of bit synchronizers, decommutators, time code readers, bus monitors and processing engines. Depending on the system configuration, the actual hardware could be a multi-function adaptor for a Flight-Line Checkout System or a VME crate that has many adaptors and is accessed via a local area network.

The Project Manager is used to select the desired modules for a flight test and then used to assign available configurations to the selected modules. Multiple configurations are supported and the selection process defines the setup of individual modules, definition of the data streams, definition of each sensor, measurement, processed and derived parameter, algorithm, etc. Project management functions include version control, previous version restore and archive capabilities.

A project is a collection of related lists or database tables. A project allows you to keep configurations for specific tests and programs together under a single named project and the manager can load, compile and run these configurations as a group. From the File menu you can open and save projects, modify, then save as new projects, and configure the system to have the most recent project loaded at start up.

SYSTEM MANAGER

The Vista GUI is aptly called the System Manager. It provides a top-level display that enables the user to see high-level system status and data, and allows navigation to the various plug-ins. The System Manager derives much of its design from experience gained in delivering generations of graphical workstation-based systems and listening to our customers. It incorporates both new technologies and expands upon older features to provide a simple uncluttered tile format. As a pure Java application, it will run on any platform that supports the language. Users may choose the System Manager’s look-and-feel between Microsoft Windows (available only on PCs running MS-Windows®), OSF/Motif (available on all platforms), and the “metal” platform developed jointly by Sun and Netscape.

System Manager includes a full-featured integrated environment that has the flexibility to be customized by the end user. The tabbed workspace feature provides an efficient means of building multiple screen layouts that can be quickly switched using the tabs along the bottom of the workspace area. Tabs can be added, named and filled with the available plug-in applications by the user. Additionally, various docking options are available that allow individual plug-in applications to be contained within the System Manager workspace or to be docked to the host computers desktop.
TELEMETRY EQUIPMENT CONFIGURATION

TEC MANAGER

The Telemetry Equipment Configuration (TEC) Manager is the primary Vista application used to configure the airborne hardware. TEC Manager, similar to the Vista System Manager, has individual work spaces devoted to the various TEC subsystems: Airborne hardware configuration, measurement management (including transducer and bus parameter management) and frame format operations. These subsystems are used to describe the airborne hardware configuration, the details of the measurements being acquired and how to encode the acquired data for subsequent transmission for ground processing.

It is important to note that the measurement details include information that enables the VistaTEC components to completely configure both the airborne hardware and any ground hardware included in the project. For example, airborne signal conditioner gains and offsets can be computed automatically to meet a desired resolution and accuracy. Transducer calibration information can be utilized to provide accurate engineering unit conversion during ground processing. Display information is also included in a measurement description and is used to automatically configure ground displays.

AIR CONFIGURATION SUBSYSTEM

The Air Configuration Subsystem is used to develop or edit an airborne hardware configuration. A graphical editor is provided to identify the hardware components and how they are interconnected. Hardware components include the master unit, remote units, signal conditioners and product line specific modules. This subsystem also has the capability to enter or modify channel specific settings for the various analog and digital channels. Settings are stored directly within the hardware configuration database tables for the current project. The channel specific settings are normally automatically configured. However, user entered values place the channel into a manual configuration mode and prevent VistaTEC from changing values during compile time.

MEASUREMENT SUBSYSTEM

Measurement Subsystem consolidates all aspects of a measurement channel from the sensor calibration information, through the signal conditioner and data acquisition system to the Flight-Line Checkout System, EU conversions and display process. A master measurement list contains the information used by all of the other Vista components, including the Flight-Line Checkout System.

The Measurement Subsystem provides an editor function that supports all TMATS measurement definition attributes, in addition to other application specific information, including display settings, measurement grouping and final calibration parameters. When a selected measurement is associated to a data acquisition channel and corresponding sensor, a sensor calibration data set can be attached to the measurement. The data conversion information is also used by the Vista TEC Flight-Line Checkout System to perform the proper engineering unit conversions on the acquired data.

AVIONICS DATA BUS SUPPORT

A vehicle under test can be configured with any number of avionics buses that are typically outside the control of the PCM data acquisition system. This is due in part to the fact that the MIL-STD-1553 or ARINC components are manufactured by 3rd party vendors for avionics applications. A vendor’s application solution includes setup, configuration, and monitoring software that is specific to the hardware components that are supplied.

In most flight test scenarios, there is a requirement to see some if not all of the available bus data. To support this, a data acquisition system can be configured with the appropriate monitor module that allows it to unobtrusively extract data from the selected bus and insert the data into the output PCM stream. To support this functionality, Vista TEC is supplied with extensive import capability that allows it to obtain the necessary information regarding the measurements and messages that are present on a particular bus.
FRAME FORMAT SUBSYSTEM

The Frame Format Subsystem is used to either manually enter a frame format or to access the Frame Format Auto Populator. A frame format is required to instruct the telemetry hardware how to encode the desired measurements into the telemetry data stream. This same format is used by the Flight-Line Checkout System to set up the decommutator. Regardless of the mode used, this subsystem draws information from the hardware tables and selected measurement list to develop a populated format that does not violate any hardware restrictions (e.g., settling times, maximum sample rates, etc.)

The Frame Format Auto Populator provides an automatic frame population function. It has the capability to populate an existing frame layout, either empty or partially populated, and place the available measurements based on sample rate requirements. The output is a populated frame format that does not violate any specific data acquisition hardware restrictions. The Auto Populator also includes an optimization capability that can fully define the resulting format including bit rate, common word length, frame length and depth. The resulting frame format can be viewed or edited using a tabular or graphical frame map editor.

For manually populated frame formats, this subsystem provides a format validation tool that can be used during format development. It will quickly identify any hardware restriction violations such as settling times, maximum sample rates, etc.

AIRBORNE HARDWARE LOADER

The VistaTEC Airborne Hardware Loader is responsible for uploading a compiled format to the target data acquisition system via an industry standard interface. Possible interfaces include Serial or Ethernet (all speeds and wireless supported). The TEC Loader selects the required interface based upon the properties of the data acquisition system that is specified within the hardware configuration. The TEC Loader makes use of the I/O functions supplied by the computer interface’s hardware drivers, while it handles all necessary application specific handshaking with the target unit.

The TEC Loader includes an Inventory Validation capability that utilizes the Electronic Data Sheet (EDS) feature that is built into the supported product lines. It ensures that the configuration being loaded matches the physical hardware configuration. Any deltas between the database and the physical hardware are reported. This EDS capability is also used for report generation where model, serial and version numbers are provided.

The TEC Loader is accessible from within TEC Manager and via the Vista Project Manager.

IMPORT/EXPORT CAPABILITIES

Vista TEC provides industry standard and optional custom interfaces to/from external end user systems. Several types of interchange formats are available based on the desired source information.

Vista provides project level import/export capability that includes XML and TMATS interchange formats. Vista TEC provides additional interchange formats tailored to airborne hardware configuration. XML, CSV, TMATS, MicroDAS, ADASWARE and Excel interchange formats are all supported. The TMATS format provided via TEC Manager includes fragmented parameter and EU conversion information. L3 can develop unique import/export formats to meet other third party or heritage applications software.

FLIGHT-LINE CHECKOUT SYSTEM

The Flight-Line Checkout System (FLCOS) integrates an L3 airborne data acquisition system loader and a full featured telemetry decommutation system into a single, small, general purpose PC or workstation. Like other Vista plug-ins, the FLCOS is fully integrated into the workspace. The currently selected project is used to configure the decommutator making the process transparent to the end user. Since the FLCOS draws its setup information from the same database tables used to develop the TEC and project, changes are automatically propagated to ground operations.

The L3 FLCOS solution also supports the latest network based data acquisition systems which do not require specialized ground telemetry hardware. Standard Ethernet interfaces are used resulting in full FLCOS capability in laptops and tablets.
CVSD VOICE ENCODING & DECODING

Vista™ includes a plug-in component that supports CVSD decoding for those applications that require the transmission of voice from the vehicle. VistaTEC performs the setup of supported CVSD encoders and provides information such as sampling rate and parameter selection to the decoding process that is resident on the FLCOS or the ground station. CVSD data that is received by the ground unit is buffered and then converted to WAVE format, which then can be passed directly to the Java Sound API via the multimedia interface within the computer, thus eliminating the need for any specialized external hardware.

JPEG-2000 VIDEO ENCODING & DECODING

VistaTEC™ includes a Media Player plug-in component that supports JPEG-2000 based video data streams. The supported airborne hardware product lines include an audio and video encoding module that has the capability to embed an asynchronous data stream into the data acquisition system PCM data. This data stream contains a L3 proprietary packet based protocol which is decoded by the VistaTEC Media Player. For users who wish to use non-Vista based ground support equipment, L3 offers an API allowing users to integrate the decoding directly into their processing systems.

SUPPORTED OPERATING SYSTEMS

The minimum recommended system requirements are as follows:

- System Processor: Intel Core i5
- System Memory: 4.0 GB
- Disk Space: 500 GB
- Windows DB Server: MS SQL Server Express 2008
- Linux DB Server: PostgreSQL
- Graphics Adapter: 1 GB Video Adapter
- Network Adapter: 10/100/1000 Ethernet
- Additional Storage: CD-ROM, DVD-ROM

Depending on the desired product line support, additional hardware-related issues must be considered. Some product lines require a RS-232 serial port for configuration and control. For non-network based data acquisition systems, PCM capture and processing hardware is necessary requiring free expansion slots in the host computer.

In many cases, a laptop computer can be used to host VistaTEC to provide an efficient means of system checkout and sensor calibration.

HOST COMPUTER REQUIREMENTS

Vista™ will operate on the following Operating Systems:

- Microsoft Windows® 7 Professional (32-bit)
- Microsoft Windows 7 Professional (64-bit)
- Microsoft Server 2008 R2 (64-bit)
- Microsoft Server 2003
- Microsoft Windows XP Professional
- Microsoft Windows 2000 Professional
- Red Hat Enterprise Linux (versions 4 and 5)
- CentOS

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