

X-Modal Information Sheet:

X-Modal is an experimental modal analysis research software package that the University of Cincinnati, Structural Dynamics Research Lab (UC-SDRL) has, and continues to, develop in conjunction with a group of sponsoring companies and the UC-SDRL Research Software Consortium. The primary function of this software package is to provide a flexible environment for acquiring and analyzing data acquired for the purpose of experimentally determining the modal parameters of a structure in research situations. The flexible environment involves a unique data management structure as well as a user programming capability. X-Modal does acquire time, power spectra and frequency response function (FRF) data using an embedded data acquisition module (VACQ) for a limited set of specific hardware or, via a data through-put mode, using digitized time data in the Standard Data Format (SDF) or other compatible UFF and Matlab file formats. X-Modal can utilize data acquired from any data acquisition system as long as the data can be provided in Universal File Format (UFF) or a documented MATLAB® data format. X-Modal provides a graphical user interface (GUI) in parallel with a command driven interface to provide users with any type of programmatic interaction desired. X-Modal utilizes the MATLAB® MCR computational engine so that the user does not have to have a copy of Matlab. A user can use their own copy of Matlab to post-process data exported from X-Modal in UFF or Matlab data file formats to provide user programmability as well as to implement all the major modal parameter estimation algorithms documented in the literature. Release 3.4 of X-Modal is now available.

Software Control/Certification:

The X-Modal software is developed as a MATLAB® MCR executable module (program) and is constantly checked and verified against analytical data. Users are expected to conduct their own validation experiments with experimental and analytical data. The Matlab source scripts are no longer available to licensed users unless they are users at the Enterprise License level or possibly Members of the UC-SDRL Research Software Consortium.

Hardware Requirements (Minimum):

Currently, X-Modal, Version III, Release 3.4, requires a personal computer with the following minimum hardware specifications:

- 4 GB RAM, or more, is recommended (more for large channel data acquisition)
- 100 GB Disc Memory for data storage (only 1-2 GB is needed for software w/o data)

Software Requirements:

The X-Modal, Version III, software package is written in the MATLAB® programming language compatible with the graphical windows computing environment of Matlab 20145a with the following minimum software specifications (Note: No separate executable copy of Matlab is required):

- WIN-7 or WIN-8 (64 bit), LINUX OS and Apple OS (No data acquisition)

A WIN-7 or WIN-8 (64 bit) OS environment is the recommended and primary target for most users.

License Requirements:

The UC-SDRL will grant a license to use UC-SDRL Research Software, including X-Modal, Version III, for a Single User, Multiple Users (16) or Education Site Users (32). An Enterprise License is available for corporate partners that require specialized situations. Any license to use UC-SDRL Research Software is a license in perpetuity but does not include any warranty of the software, does not give permission to further distribute X-Modal, and does not allow any further commercialization of X-Modal without express legal consent. A license agreement from the University of Cincinnati, that includes the computer workstation(s) information where UC-SDRL Research Software will be executed, is required prior to distribution of any software. The license agreement and all related information can be found at the UC-SDRL web site. This is not a legal statement of the provisions of the license; please consult the license agreement for details.

Distribution/Maintenance Fee:

While there is no charge for the UC-SDRL Research Software license, there is an annual distribution/maintenance fee of US\$1250 (Single & Education Site Users) to US\$3750 (Multiple Users) to cover costs of support personnel and license code updates. This fee covers an initial distribution and any major revisions for a period of one year to the user based upon the license. Only one copy and form of media will be provided per license and/or site (electronic download is preferred). Further updates/revisions will be made available, after the one year period, based upon a

yearly distribution/maintenance fee. Subsequent distribution/maintenance fees are subject to change. Users are encouraged to prepay the distribution/maintenance fee for multiple years in order to assist in future development and/or to lock in their distribution/maintenance fee rate.

Distribution Deliverables and Media:

The deliverables include the binary form of X-Modal, designed to run on a specific computational engine (MCR version) of MATLAB®, and Portable Document Format (PDF) form of all documentation, distributed electronically. This includes downloadable video tutorials (mp4) from the UC-SDRL Web Site. The computational engine (MCR) version of MATLAB® is included so the user will not need to have their own licensed version of MATLAB®. This version does not allow user programming or access to the MATLAB® command line. Software is generally provided via electronic download over the Internet. Software can be provided on limited forms of other media upon request.

Documentation:

Documentation and on-line help is provided electronically from within X-Modal via any network browser using HTML (HyperText Markup Language) and/or the Adobe Acrobat® Reader in Portable Document Format (PDF). All documentation can be loaded locally to minimize the need for access to the Internet. Paper copies can be processed by the user by copying the Encapsulated Post Script (EPS) files to any Post Script or Encapsulated Post Script, Level II printer. Video tutorials are provide in MP4 format.

Training:

Voice annotated video training is available on the UC-SDRL Web Site that includes numerous 10-20 minute video sessions that are designed to assist a user in using X-Modal for the first time. Installation assistance and/or minor questions can be answered via telephone, E-Mail, Skype, GoToMeeting or FAX. If more detailed installation or training is required, research assistants from the UC-SDRL can be hired as consultants (approximately \$500 per day plus expenses) to provide on-site assistance.

Current Capability:

Current X-Modal, Version III, capabilities are as follows:

- Realtime animation with Graphical User Interface (GUI) control of all animations controls, including QuickTime movie export.
- Flexible data management utilizing data group and mode group workspace concepts pioneered in X-Modal 1.x.
- SDOF modal parameter estimation featuring single mouse click interaction with the animation module.
- MDOF modal parameter estimation utilizing the Unified Matrix Polynomial Approach (UMPA), which includes LSCE, PTD, ERA, PFD, RFP, and the latest Poly LSCF (PolyMAX®) methods as well as Autonomous Modal Parameter estimation using the CSSAMI procedure.
- Universal File Format, including Universal Binary File Format, compatibility with existing commercial software.
- General data acquisition, particularly including MIMO FRF methods for excitor inputs or MRIT FRF methods for impact testing. For further information, please see X-Modal - Virtual Data Acquisition (VACQ) document.

Availability:

X-Modal, Version III, Release 3.4, software is currently available via electronic download, pending signed license agreements and prepayment of the Maintenance/Distribution Fee. Single User Licenses are available via a "click-thru" license agreement via the Internet.

For More Information:

For more information and/or details concerning UC-SDRL research software, please contact:

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