

z_*OBSOLETE* Recent Changes and DOWNLOADS

****OBSOLETE DO NOT USE****

SEE <https://bitbucket.org/xromm/>

July 2016

- 7/30
 - New version XROMM_MayaTools_2.1.8

June 2016

- 6/2
 - New version XROMM_Maya_Tools_2_1_7; fixes shelf bug in maya 2014.
 - New version XROMM_Maya_Tools_2_1_6

May 2016

- **CRITICAL UPDATE: Use new XMA Lab software for marker-based XROMM. XMA Lab replaces MATLAB XrayProject. See Bitbucket XMA Lab wiki for XMA Lab User Manual (not this wiki).**

December 2015

- 12/01
 - **No new Updates to XMA Lab will be posed here**
 - **New versions of XMA Lab are now available ONLY on Bitbucket**
 - [Autoscooper V2 sources](#) are also now available on Bitbucket (no new functionality)
 - OBSOLETE: Last version here of XMA Lab (1.3.0) Mac and Windows

November 2015

- 11/19
 - New version of the XMA Lab (1.2.19) [Mac](#) and [Windows](#)
- 11/12
 - New version of the XMA Lab (1.2.18) [Mac](#) and [Windows](#)
- 11/06
 - New version of the XMA Lab (1.2.17) [Mac](#) and [Windows](#)

October 2015

- 10/07
 - New version of the XMA Lab (1.2.16) [Mac](#) and [Windows](#)

September 2015

- 09/18
 - New version of the XMA Lab (1.2.15) [Mac](#) and [Windows](#)
- 09/18
 - New version [z_*OBSOLETE* Recent Changes and DOWNLOADS](#). Fixes bug in vAvg2 and makes minor improvements to CTMexport functionality.
- 09/15
 - New version of [XrayProject-2-2-7](#) (MATLAB program package). Bugs fixed to make it work with Matlab version 2013
- 09/10
 - New version [z_*OBSOLETE* Recent Changes and DOWNLOADS](#)

August 2015

- 08/28
 - New version of the XMA Lab (1.2.14) [Mac](#) and [Windows](#)
- 08/21
 - New version of the XMA Lab (1.2.13) [Mac](#) and [Windows](#)
- 08/20
 - New version of the XMA Lab (1.2.12) [Mac](#) and [Windows](#)

July 2015

- 07/29
 - New version [z_*OBSOLETE*](#) [Recent Changes](#) and [DOWNLOADS](#)
- 07/29
 - New version [z_*OBSOLETE*](#) [Recent Changes](#) and [DOWNLOADS](#) Fixes bug in export script. Adds direct link to Google doc for bug reporting as a shelf button.
- 07/24
 - New version of the XMA Lab (1.2.11) [Mac](#) and [Windows](#)
- 07/17
 - New version of the XMA Lab (1.2.10) [Mac](#) and [Windows](#)
- 07/10
 - New version [z_*OBSOLETE*](#) [Recent Changes](#) and [DOWNLOADS](#)
 - [XROMM Maya Tools](#) version changes, feature request, and bug reporting.
- 07/01
 - New version of [XrayProject 2.2.6](#) (MATLAB program package). Bugs fixed to make it work with recent versions of MATLAB. [Instructions for installing XrayProject](#).

June 2015

- 06/26
 - New version of the XMA Lab (1.2.9) [Mac](#) and [Windows](#)
- 06/01
 - New version of the XMA Lab (1.2.8) [Mac](#) and [Windows](#)
- 06/01
 - New version of the XMA Lab (1.2.7) [Mac](#) and [Windows](#)

May 2015

- 05/08
 - New version of the XMA Lab (1.2.6) [Mac](#) and [Windows](#)
- 05/06
 - New version of the XMA Lab (1.2.5) [Mac](#) and [Windows](#)

March 2015

- 03/25
 - New version of the XMA Lab (1.2.4) [Mac](#) and [Windows](#)
- 03/017
 - New version of the XMA Lab (1.2.3) [Mac](#) and [Windows](#)
- 03/13
 - New version of the XMA Lab (1.2.2) [Mac](#) and [Windows](#)
- 03/12
 - New version of the XMA Lab (1.2.1) with support for avi and cine movies [Mac](#) and [Windows](#)
- 03/05
 - New version of the XMA Lab (1.2.0) [Mac](#) and [Windows](#)

December 2014

- 12/03
 - First release of the XMA Lab [Mac](#) and [Windows](#)

October 2014

- 10/06
 - New version of autoscopper released (beta) [.Mac \(OpenCL\)](#), [Windows \(OpenCL\)](#) and [Windows \(Cuda\)](#)

June 2014

- 06/20
 - New version of [XROMM_Maya_Tools_2_1_0](#) Includes several critical bug fixes from the previous version (written by David Baier).
- 06/16
 - Start of Reorganization of Wiki for new Undistorter, Calibration and Maya Tools versions.
- 06/01

- New XROMM Undistorter 1.0.1 for [Mac OS](#) and [Windows](#) (written by Ben Knorlein)
- New XROMM Calibration Tool (beta) for [Mac OS](#) and [Windows](#) (written by Ben Knorlein)
- New version of [XROMM Maya Tools 2.0.9](#) and [instructions for installation](#) (written by David Baier)

May 2014

- 05/22
 - New version of [XrayProject 2.2.5](#) (MATLAB program package). [Instructions for installing XrayProject](#). Includes [ConvertCSVAndPointsToLUT](#) (converter for undistortion matrix from new XROMM Undistorter tool).

February 2014

- 02/23
 - Added link on [XROMM AutoScoper](#) page to bitbucket source code for XROMM AutoScoper 1.14rc (Mac OS)
- 02/08
 - New version of XrayProject 2.2.4; cineInfo and cineRead were changed to properly rotate according to the cine file header [Download is XrayProject-2.2.4.zip](#).
- 02/02
 - AutoScoper page: Added link to upper extremity (radius, ulna and 3rd metacarpal) example data set and tutorial instructions
 - AutoScoper page: Added link to XROMM AutoScoper User Group

January 2014

- 01/25
 - Added [XROMM Undistorter Page](#) for stand-alone undistortion program, written by Ben Knorlein from [CCV](#)
 - [Download XROMM Undistorter v1.0.0 for Mac OS](#).
 - [Download XROMM Undistorter v1.0.0 for Windows](#).

December 2013

- 12/21
 - Added [MRI2Autoscooper workflow instructions](#) to Autoscooper page. Gulshan Sharma, PhD, University of Calgary developed an Amira Workflow for creating a volumetric bone models from MRI scans. [Download MRI2Autoscooper.pdf](#)

March 2013

- 03/13
 - New version of XrayProject 2.2.3 (similar to 2.2.2, but some bugs fixed). Updated aviread/mmreader to VideoReader. If you are using versions of Matlab newer than 2011a, you will need XrayProject-2.2.3 [Download is XrayProject-2.2.3.zip](#).
- 03/03
 - (Warning; buggy for cine movies. Use 2.2.3 instead). New version of XrayProject 2.2.2. Updated aviread/mmreader to VideoReader. If you are using versions of Matlab newer than 2011a, you will need XrayProject-2.2.2 [Download is XrayProject-2.2.2.zip](#).

June 2012

- 06/13
 - [Chukkar Partridge rigged model](#) (articulated skeleton) data set and rotoscoping instructions posted
- 06/10
 - New version of Maya Tools 2.0.8 folder with new one- and two-marker rotoscoping scripts. [Download is XROMM_Maya_Tools_2_0_8.zip](#).
 - New version of XrayProject 2.2.1. Updated calls to FILEPARTS function. If you are using versions of Matlab newer than 2010b, you will need XrayProject-2.2.1 [Download is XrayProject-2.2.1b.zip](#).
- 06/08
 - Added instructions for [one- and two-marker bone animations](#), and instructions for [creating a framespec file](#).
- 06/02
 - Reorganized [Marker-based XROMM](#) page. Added a new step: Correct distortion and calibrate; link to new [Checking Calibration](#) page. Divided Maya steps into Animation step and Analysis steps.
- 06/01
 - Added page with instructions to [check your calibration](#). Reorganized and cleaned up [Maya instructions](#) to work with models. Reorganized [Scientific Rotoscoping](#) page.

May 2012

- 5/16
 - Front page reorganized to link to four other pages: [Marker-based XROMM](#), [Scientific Rotoscoping](#), [XROMM AutoScoper](#), [XMAPortal User Manual](#)

July 2011

- 07/10
 - Version of Maya Tools 2.0.7 folder with updated installation instructions. [Download is XROMM_Maya_Tools_2_0_7b.zip](#).

- 7/08
 - Three useful programs for Matlab posted:
 - An image/video processing interface, allowing users to easily rotate, crop, manipulate contrast/brightness, detect edges, and other operations: <https://wiki.brown.edu/confluence/display/ctx/Image+Processing+MATLAB+program>
 - A crosscorrelation analysis tool, which calculates correlation coefficient and optimum lag between two kinematic variables: <https://wiki.brown.edu/confluence/display/ctx/Crosscorrelation+analysis+MATLAB+program>
 - A Confidence interval calculator for kinematic data, which splines multiple observations of a behavior independently, calculates & graphs confidence envelopes as a function of cycle duration: <https://wiki.brown.edu/confluence/display/ctx/Confidence+interval+MATLAB+program>
- 7/05
 - New version of XrayProject 2.2.0 posted; GUI header was corrected to say 2.2.0. [Download is XrayProject-2.2.0.zip](#). NOTE: XrayProject 2.2.0 works only with MATLAB 2010b or later MATLAB versions.

June 2011

- 6/26
 - [click here to download Radiographics tutorials for radiology residents](#)

February 2011

- 02/14
 - KNOWN PROBLEM: In rigidBody.m, a gap in digitization followed by a single digitized frame, followed by another gap sometimes causes misalignments. Similarly, when working with four markers on a bone (e.g., markers 7-8-9-10), when the first marker (e.g., marker 7) becomes out of range of imaging or is not digitized, we cannot track (in Maya) for a while although we have 3 points. Then, when the first marker (e.g., marker 7) returns, the bone is misaligned. However, it is possible to track with non-first markers missing (e.g., markers 7-9-10, markers 7-8-10, or markers 7-8-9).
- 02/02
 - XrayProject version 2.2 scripts support video input from files with .tif extension that contain more than one image frame. Such files can be saved using the phantom software (8,24 tif option). Collections of single tif images can be combined to create such files using the script stacktif.m.
 - When multiple files are selected, applyUndistort determines which jpg and tif files have names with suffixes of dot followed by numeral and treats the files with sequential numbers and same prefix as frames of a stack. For example, if four single-image files named pig1.003.tif, pig1.004.tif, bird3.jpg, bird6.002.jpg, and multiple images files named foot.tif and hand.avi are selected, applyUndistort will examine the files and report the starting files for five sequences:
 - pig1.003.tif – 2 frames
 - bird3.jpg – 1 frame
 - bird6.002.jpg – 1 frame
 - foot.tif
 - hand.avi
 Next, applyUndistort will process the first sequence, then loop back and process the second sequence, etc. For each sequence, the user will be prompted for "Output Type and Range". In DLTdv3Brown (Digitize), the "Pick movie file" dialog permits one file to be selected for each movie. If the file is a tif or jpg with filename that ends with a dot followed by a number, the script treats the named file as the first of a stack. Subsequent frames are assumed to have names with suffixes that are increments of the first name. For example, if the file name pig.0008.tif is selected, pig.0008.tif is the first frame, and, the script will look for subsequent frames, pig.0009.tif, pig.0010.tif,...etc., until it fails to find a file with the expected name and assumes the end of the sequence was reached. If the folder also contains earlier images, e.g., pig.0007.tif, these will be ignored.

January 2011

- 01/25
 - XrayProject version 2.1.9 scripts support multifile input selection and input of single or stacked tif or jpg file(s) to UndCal, UndistortVideo (applyUndistort), and Digitize (DLTdv3Brown). [Download is XrayProject-2.1.9.zip](#).

November 2010

- 10/24
 - MATLAB software implementing the algorithm described in (<http://www.ncbi.nlm.nih.gov/pubmed/20167324J> Biomech. 2010 May 28;43(8):1623-6. Epub 2010 Feb 18.). [Download is z_*OBSOLETE* Recent Changes and DOWNLOADS](#). This MATLAB software is not actively supported.

October 2010

- 10/28
 - XrayProject version 2.1.8 fixes the potential brightness variation of version 2.1.7. Version 2.1.8 finds the maximum pixel value for the entire movie, then scales each frame so the maximum value for the movie is mapped to 255 (i.e., the maximum that can be represented in 8-bits). Code for other possible scaling methods and bit-depths is commented out in this version. [Download is XrayProject-2.1.8.zip](#). Implementation details: Because undistortion can increase the number of bits required for a pixel, a temporary file is used to hold an unscaled high-resolution version of the entire movie. The file is named scratch_tmp and placed in the XrayProject 2.1.8 directory. If a file named scratch_tmp already exists, it will be overwritten. After the undistortion pass is completed, the temporary file is read and each frame is scaled and written to the permanent output file or stack of files. Finally, the temporary file is deleted. The user may edit the Matlab script to change the temporary file name. The script also has lines, commented out, that

can be used to cause Matlab to open a file with a name that is likely, but not guaranteed, to be unique. However, it may be bothersome to try to locate a large, randomly-named, temporary file if Matlab crashes before the file is deleted.

Four warning messages are suppressed by "warning('off'..." calls in the script XrayProject.m.

Matlab defaults are used for the frame rate in calls to avifile. This change was made because specifying the frame rate (obtained from the cine file headers) did not seem to work correctly in some earlier versions of Matlab. While the default frame rate is not correct either, it does not seem to cause as many problems when playing the movie with some media players. In a future version of XrayProject, aviread calls will need to be replaced by mmreader calls because Mathworks is phasing out aviread and aviinfo. We will endeavor to fix the frame rate problem when converting to use mmreader.

September 2010

- 9/30
 - XrayProject version 2.1.7 accepts any cine input for Undistort and UndCal steps and UndistortVideo. It has been tested with 8- and 12-bit cine grid, cube, and movie files, jpg, tif, and avi files. This version can process cine of any bit-depth (8-, 10-, 12-, 14-, or 16-bits) but outputs only 8-bit tif format. Image data are scaled to 8-bits just before it is written out. Download is [XrayProject-2.1.7.zip](#)
 - **WARNING:** Image scaling in XrayProject version 2.1.7 may cause brightness to vary between frames in an undistorted sequence. We recommend using XrayProject version 2.1.6 for 8-bit files until this problem is resolved.

August 2010

- 8/31
 - XrayProject version 2.1.6 fixes layout problems that were introduced in version 2.1.5 on the Mac when the XrayProject window was made smaller to fit on 600 by 800 screens. When the XrayProject window is loaded, the font is set to Tahoma if a PC version of Matlab. If not running a PC version of Matlab, then the font is set to Arial Narrow and positions of objects (based on font character sizes) are adjusted. This version includes the reordered workflow for rigidBody.m which was added in version 2.1.5. Download is [XrayProject-2.1.6.zip](#)
- 8/16
 - XrayProject version 2.1.5 has small changes to the user-interface. Workflow is reordered in rigidBody.m and the XrayProject window was made smaller to fit on 600 by 800 pixel screens.
- 8/02
 - XROMM Maya tools 2.0.7. New pan and scan tool for rotoscoping and helical axis import tools. [XROMM_Maya_Tools_2_0_7.zip](#)
 - Helical axis scripts for Matlab. See instruction page on helical axes before using. [Helical1.0.1.zip](#)

July 2010

- 7/20
 - A flow diagram for XrayProject is available as a one-page pdf. Input files, which must be created or obtained beforehand, are represented by yellow boxes. Output files, which are produced by XrayProject functions, are blue boxes. Functions are white boxes. Download is [XrayProject file flow diagram.pdf](#).

June 2010

- 6/30
 - added a link on front page to [Radiographics tutorials for radiology residents](#)
- 06/10
 - [Chukar Partridge data set for articulated model \(digital marionette\) rotoscoping](#)
- 06/09
 - New link to [Alligator Coracoid Example Data Set](#) from Brown Digital Dropbox
- 06/05
 - XROMM Maya tools 2.0.5. New import data script. Works with Maya 2011. [XROMM_Maya_tools_2.0.5](#)
- 06/04
 - XrayProject 2.1.4 version has same functionality as version 2.1.3, but does not require the Matlab Mapping Toolbox. Undistorter.m, DLTcalibration5x.m, and mayacam.m are changed to eliminate calls to the function rad2deg. Three Matlab Toolboxes are still required: Image Processing Toolbox (used in many places), Signal Processing Toolbox (used only for "filterXYZ" button functionality), and the Symbolic Toolbox (used for "Calibrate 3-D" button functionality and the stand-alone script mayacam.m). Download is [XrayProject-2.1.4](#)
- 06/03
 - new link to [Pig Feeding Example Data Set](#) from Brown Digital Dropbox

May 2010

- 5/27
 - XrayProject 2.1.3 version has changes to RigidBody.m and svdRigid.m to allow "Calculate Rigid Body Motion" to work even if the files contain partially digitized markers. Download is [XrayProject-2.1.3](#)
- 5/21
 - XrayProject 2.1.2 version fixes bug that caused 8-bit cines to be mistakenly stored as 32-bit values in some parts of XrayProject. Download is [XrayProject-2.1.2](#)
- 5/10
 - XrayProject 2.1.1 version fixes failure to process TIF calibration cube files. Download is [XrayProject-2.1.1](#)

April 2010

- 4/26

- XrayProject 2.1.0 version changes
 - Download is [XrayProject-2.1.0](#)
 - changes to applyUndistort.m and Undistorter.m fix cases where image height and image width were reversed for jpg and tif grid images. This fix is vital when working with non-square images.
 - the Undistorter.m function calimread has been separated from Undistorter.m and the function returns the image header information.
 - other changes may restore backward compatibility with Matlab 7.4 (R2007a). These have not been tested with R2007a.
- 4/6
 - XROMM Maya tools version 2.0.4. New features include relative motion tool and new xcam import window.
 - [z_*OBSOLETE* Recent Changes and DOWNLOADS](#)

March 2010

- 03/22
 - XrayProject 2.0.9 version has small change to cineRead.m to support reading past the 2GB file boundary in CINE files. Download is [XrayProject-2.0.9](#)
- 03/01
 - Fixed minor bug in XROMM shelf header and removed line -commandRepeatable 1 from shelf
 - Download is [XROMM_Maya_Tools_2.0.3](#)
- 03/01
 - XrayProject 2.0.8 version changes:
 - Download is [XrayProject-2.0.8](#)
 - Undistorter.m and Undistorter.fig replace UndistortAuto6x.m.
 - Undistorter Size threshold slider may be rescaled by pressing "2X" button or "1/2X" button.
 - cineInfo and cineRead are separate m-files. applyUndistort.m, DLTdv3Brown.m (mediaRead), and Undistorter.m (calimread) call cineInfo and cineRead.
 - cineInfo and cineRead use more cine file header information to support more cine file formats, including 12-bit cine support.
 - bug fixes to support non-square cine files.
 - applyUndistort.m (UndCal and UndistortVideo) with cine input supports avi output.
 - applyUndistort.m (UndCal and UndistortVideo) no longer silently overwrites existing files with avi or cine input to stack of tif or stack of jpg output. Warns and creates unique filenames instead.
 - new feature in applyUndistort.m (UndCal and UndistortVideo): movie conversion without (re)processing to remove distortion. On "Cancel" at prompt for UNDTFORM file, a dialog prompts to choose "cancel" or choose "continue" to save movie in different format.
 - additional input checks and error recovery in applyUndistort.m (UndCal and UndistortVideo).

February 2010

- 02/07
 - [New Maya Tools, version 2.0.3](#)
 - Bug fix in xcam.mel script. Read order for dimensions for displaying texture maps on image planes corrected (height then width).
 - Download is [XROMM_Maya_Tools_2.0.3](#)
- 02/08
 - [New framespec file for 64 point, 6.5 cm spaced calibration cube](#) This framespec file imports correctly as XYZ points into Maya. -- Download is [framespecV2.csv](#)

December 2009

- 12/11
 - [New Maya Tools, version 2.0.2](#)
 - Create anatomical axes with or without the positioning locators. After selecting the jAx shelf tool, or typing jointAxesDual on the MEL command line, there are two buttons: create Axes with Locators or Create Axes without Locators.
 - There is a new script, changeRotKeepAnim2.mel, and Shelf tool CRO. The change rotation order script asks for you to put in the rotation order you want for calculating the output from a joint coordinate system. Due to Maya conventions, enter zyx for what would usually be called xyz order. Default is zyx.
 - Download is [XROMM_Maya_Tools_2.0.2](#)

November 2009

- 11/18
 - XrayProject version 2.0.7 changes:
 - Autotrack mode has four additional choices: retreat, reverse semi-automatic, reverse automatic, and reverse multi. The pull-down menu must be used to select one of these reverse options. After a reverse-mode option is selected, the "x" key and "X" key will behave as they do for the forward options, but in reverse. The forward options and forward-mode behavior of "x" and "X" have not changed. In reverse semi-automatic mode, the "b" key behaves like the "f" key in semi-automatic mode, but in reverse.
 - Load Data requires only the *xypts.csv file. If *xyzpts.csv or *xyzres.csv are missing from the directory, user is prompted to allow XrayProject to recalculate these values or to cancel. Recalculation can take a few minutes. If cancel is selected, program will reinitialize any xypts that were read, but it will still attempt to read an offsets file. If offsets file is missing, all offsets will be set

to zero.
--filterXYZ button on XrayProject window is now in the logical work-flow location.
--Download is [XrayProject-2.0.7](#)

- 11/02
 - XrayProject version 2.0.6 changes:
 - tracks the last directory used. All file open and file save dialogs default to the last directory used.
 - butterBatch (filterXYZ) control window is resizable. Multiselect feature is working again.
 - butterBatch (filterXYZ) plots are labelled, and all files are plotted (not just the last).
 - butterBatch (filterXYZ) no longer silently writes over existing files. "_#" (underscore followed by a numeral) is appended to the filename to create a filename that is not in use, and a message appears in the console window.
 - XrayProject version number is displayed on GUI window.
 - added checks for some erroneous inputs. Instead of Matlab error messages, XrayProject messages appear and user can recover.
- Download is [XrayProject-2.0.6](#)
-

October 2009

- 10/01
 - XrayProject version 2.0.5 changes:
 - new cancel buttons, additional .cine file support, and other GUI changes are in XrayProject version 2.0.5. Download is [XrayProject-2.0.5](#)
 - it is possible to view video files without UNDTFORM or DLT files by pressing Cancel and No when prompted for these files. This is useful for viewing .cine files in Mac OS.
-

August 2009

- 08/06
 - uploaded [hierarchical Scientific Rotoscoping example data set \(srDataset\)](#) to Brown Digital Dropbox
 - 08/04
 - uploaded [Alligator Coracoid Example Data Set](#) to Brown Digital Dropbox
 - 08/02
 - uploaded [Pig Feeding Example Data Set](#) to Brown Digital Dropbox
-

July 2009

- 07/30
 - updates to Maya and XrayProject instruction pages; added images of new dialog boxes
 - 07/29
 - Resized and repositioned XrayProject windows for better appearance on Mac platform. Added a "Cancel" button to stop distortion correction of frames. Saves frames done so far, but does not change the file name (Note that default file name has the original range of frames. Users may wish to manually rename the file after using the "Cancel" button.). Download is [XrayProject-2.0.4](#).
 - 07/27
 - added SVD residuals file to output from rigidBody.m. Fixed file type default for xzypts file requested by rigidBody.m. Download is [XrayProject-2.0.3](#)
 - 07/15
 - fixed XrayProject DLTdv3Brown 'x' feature on Mac. 'x' stops autotracking. Download is [XrayProject-2.0.2](#)
 - 07/07
 - Added [Rotoscoping set-up](#) instructions.
-

June 2009

- 06/23
 - fixed header of XrayProject markerDistances.csv file. Download is [XrayProject-2.0.1](#) **Note: this upgrade requires MATLAB r2008b or higher.**
- 06/18
 - bug fix in [XROMM_Maya_Tools_2_0_1](#); the shelf file shelf_XROMM_tools_2_0_1 now has the current and correct name of the shelf in the header.
- 06/09
 - corrected typos on XrayProject-2.0.0 GUI. [XrayProject-2.0.0](#) Note: requires MATLAB r2007b or MATLAB r2008b
- 06/08
 - changed name of shelf_XROMM_tools.2.0.0.mel to shelf_XROMM_tools_2_0_0.mel. Maya does not like periods (or dashes) in mel script names. Changed folder name to agree.
 - Added note on home page about new workflow for undistorting video sequences - use XrayProject window. We are no longer updating VideoCorrect or FluoroCorrect MATLAB programs. Undistorting a video is a two-step process, with both steps accessed from the new XrayProject (version 2 or higher) window: 1. [Create an *UNDTFORM file](#) and 2. Click Undistort Video in the X-rayProject window.
 - changed workflow on home page to seven steps instead of five steps; think makes the workflow more consistent with the XrayProject window for versions 2.0.0 and higher
- 6/03
 - XROMM workflow through to calculation of rigid body motions from marker sets. Subsumes SVDRigidBodyMotion-2.0.0 and

- XrayProject-1.0.4 and VideoCorrection/FluoroCorrect. (see link at 06/09 for latest version)
- NOTE MAJOR VERSION CHANGE FOR SVD RIGID BODY CALCULATIONS. OUTPUT MATRICES ARE NOW ABSOLUTE (NOT RELATIVE TRANSFORMS). IF YOU HAVE DOWNLOADED THIS VERSION (XrayProject-2.0.0), YOU SHOULD ALSO [DOWNLOAD THE LATEST MAYA TOOLS](#), version 2 or later.
-

May 2009

- 5/26 Updated links on various wiki pages to newest software:
 - [XrayProject-1.0.4](#). See list of changes and upgrades below (under 5/7).
 - [SVDRigidBodyMotion-2.0.0](#)
 - [XROMM_Maya_Tools-2.0.0](#)
 - NOTE MAJOR VERSION CHANGE FOR SVDRigidBodyMotion. OUTPUT MATRICES ARE NOW ABSOLUTE (NOT RELATIVE TRANSFORMS). IF YOU HAVE DOWNLOADED THIS VERSION (SVDRigidBodyMotion-2.0.0), YOU SHOULD ALSO DOWNLOAD THE LATEST MAYA TOOLS (XROMM_Maya_Tools.2.0.0).
 - 5/7
 - Upgrade Xrayproject to version [XrayProject-1.0.4](#). Matlab GUIDE version of XrayProject.m; three buttons added to XrayProject.fig; uses Fluorocorrect versions of m-files called from DLTdv (i.e., FastDistortionCorrection.m and CreateLookupTable.m) instead of VideoCorrection-2.2.0 versions of these files; support for all frame sizes; corrections to four camera support; error recovery for some file dialogs and some default navigation to folders if the folders exist (see [Filename and Folder Organization](#)).
 - When MarkerA = MarkerB, Intermarker Distance plot value is -1 for frames where marker is not labelled (i.e., undigitized). markerDistances.csv file is larger because distances between marker and itself are saved. These values are NaN or 0. Both old and new files Load correctly.
 - "Save" removed from Check Distances figure because it was not needed and broken.
 - "Find marker centroid" checkbox is checked by default if required Matlab toolbox is available.
 - In Digitize, "Save File" dialog requests a prefix. If an existing file is selected, the existing file's prefix is used. When file already exists, user is asked if overwrite is okay.
 - Added Keypress features:
 - 'c' toggles "Find marker centroid" checkbox.
 - 'X' selects "multi" Autotrack mode.
 - 'F' jumps forward 50 frames.
 - 'B' jumps backward 50 frames.
 - 'n' adds a point.
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March 2009

- 3/7
 - added the Maya Mel script wsCoordinateAlongAxis.mel to the XROMM_Maya_Tools.1.0.1.zip package (necessary helper script for xcamAngle.mel)
 - added [instructions](#) for using xcamAngle.mel to extract the angle between the two x-ray cameras from mayaCam files
 - added Maya instructions for [Measuring XYZ Coordinates of a Point Over Time](#) in Maya. This is useful, for example, if soft tissue markers have been implanted and their movement relative to a coordinate system defined by the bones is of interest.
 - reorganized the page [Maya Magic: Creating and analyzing XROMM animations using MATLAB and Autodesk Maya](#), (aka [Analyzing and Visualizing your XROMM Animations](#))
 - 3/5
 - added instructions for how to [Open Maya files from a newer version with older versions](#)
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February 2009

- 2/8
 - changed organization of [front page](#) to reflect overall marker-based XROMM workflow
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November 2008

- 11/12
 - Upgrade SVDRigidBodyMotion MATLAB scripts to version 1.0.1. Scripts for converting xyzpts marker data to rigid body motion. Latest update interpolates over gaps in data of less than 20 frames.
 - 11/10
 - Upgrade Xrayproject to version 1.0.3. Check Distances bug fix; now the s.d. is calculated correctly in the Check Distances window called from DLTdataViewer. The IntermarkerDistances.m script replaces NaNs with -1s. The s.d. calculation now omits the -1 values and gives a correct s.d. (in cm).
 - 11/5
 - Laser scanning protocol added
-

October 2008

- 10/30
 - XrayProject-1.0.2 update. Includes new 2-camera MATLAB workflow and automated merging of DLTcoefs

- Updated MATLAB scrips for calculating rigid body motions from xyzpts added: SVDRigidBodyMotion1.0.0.zip
 - 10/23
 - Added this Recent Changes page!
 - 10/22
 - New method for calculating rigid body kinematics from XYZ coordinate data added (rigidBodyMotionFromMarkers.mat)
 - New MAYA MEL script added (impMatrix) to import the results from rigidBodyMotionFromMarkers
 - XROMM explanation added to front page and links renamed and reorganized
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September 2008

- New Amira instructions for making 3D bone models from CT scans
- Instructions for digitizing using XrayProject substantially upgraded

7/05

- New version of XrayProject 2.2.0 posted; GUI header was corrected to say 2.2.0. Download is [XrayProject-2.2.0.zip|confluence/download/attachments/32318/XrayProject-2.2.0.zip?version=1&modificationDate=1309895878000](http://confluence/download/attachments/32318/XrayProject-2.2.0.zip?version=1&modificationDate=1309895878000)|||||||
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NOTE: XrayProject 2.2.0 works only with MATLAB 2010b or later MATLAB versions.