

# MIRD



# dcm

*DICOM conversion software*

**User Manual**

*Version 1.0*



## Legal Notice

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## Disclosure

MIRDdcm is a software tool that aims to facilitate ease of generating, storing, and sharing data and reports via DICOM format.

## Acknowledgements

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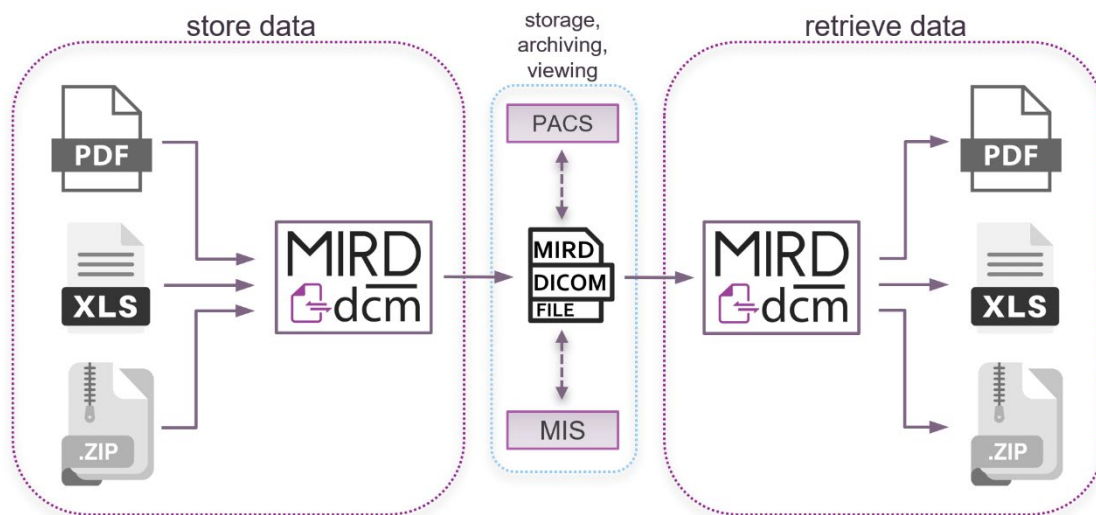
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## Background

Data and information sharing is an important aspect of medical imaging. Imaging sciences often involve multidisciplinary teams of physicians, radiologists, physicists, technologists, and researchers. Quick and secure file sharing streamlines the workflow in data and information sharing; easy file sharing allows professionals to collaborate by making patient data, images, and reports quickly accessible. Additionally, imaging researchers frequently work on clinical studies that involve multiple institutions where standard formats and easy file sharing is essential for collecting and utilizing research data. (Digital Imaging and Communications in Medicine) is a well-established standard format used in the medical field to store, transmit, and manage medical images and associated patient information. DICOM is specifically designed to facilitate the exchange of medical images and related data between different medical devices and systems, ensuring interoperability, compatibility, patient privacy and data security in healthcare settings. More information on the DICOM standard can be found at [www.DICOMstandard.org](http://www.DICOMstandard.org).

MIRDdcm is a software tool that aims to facilitate ease of generating, storing, and sharing data and reports via DICOM format. MIRDdcm allows users to deposit documents and/or data (PDF, XLSX, CSV and ZIP file formats) into DICOM files which can then be stored in archiving systems such as PACS or viewed in medical imaging software. The documents and data files can also be extracted to their original form from the MIRDdcm generated DICOM file using the same software interface. A flowchart of the MIRDdcm workflow/function is shown in Figure 1.



**Figure 1:** Flowchart of the MIRDdcm tool. MIS stands for medical imaging suite.

## Software overview

MIRDDcm generates DICOM files for storing documents/data which can then be viewed in medical imaging software. A screenshot of the MIRDDcm interface is shown in Figure 2. Features of MIRDDcm include:

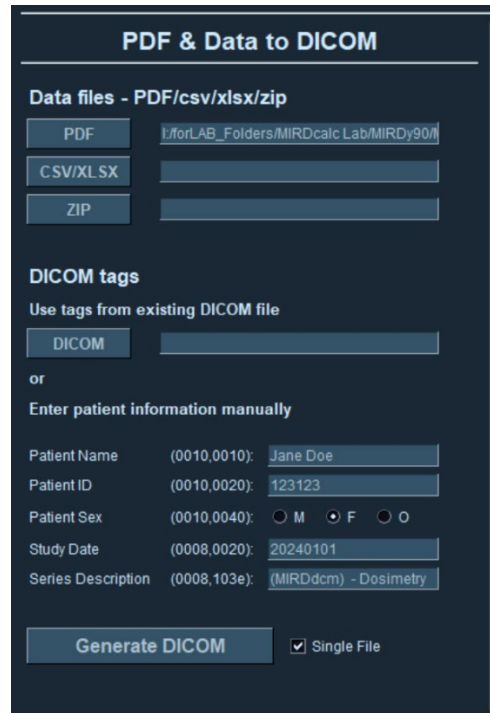
- All functions are provided in a single screen graphical user interface (Figure 2).
- Using the module “PDF & Data to DICOM” (Figure 3) the user can generate DICOM files that store PDF and/or data files.
- Using the module “DICOM to PDF & Data” (Figure 6) the user can view and retrieve the stored files from the MIRDDcm generated DICOM files.



Figure 2: A screenshot of the MIRDDcm software GUI.

## PDF & Data to DICOM

Figure 3 shows the “PDF In the “PDF & Data to DICOM” module up close.



**Figure 3.** MIRDdcm DICOM conversion input section, showing data file and DICOM tag user input fields.

**Data files:** The user may select filepath(s) for PDF, CSV/XLSX, and/or ZIP file(s) to be stored in the MIRDdcm DICOM file. At least one file (PDF, CSV, XLSX, ZIP) must be entered to generate a DICOM file. Data files will be stored in the DICOM file as private fields.

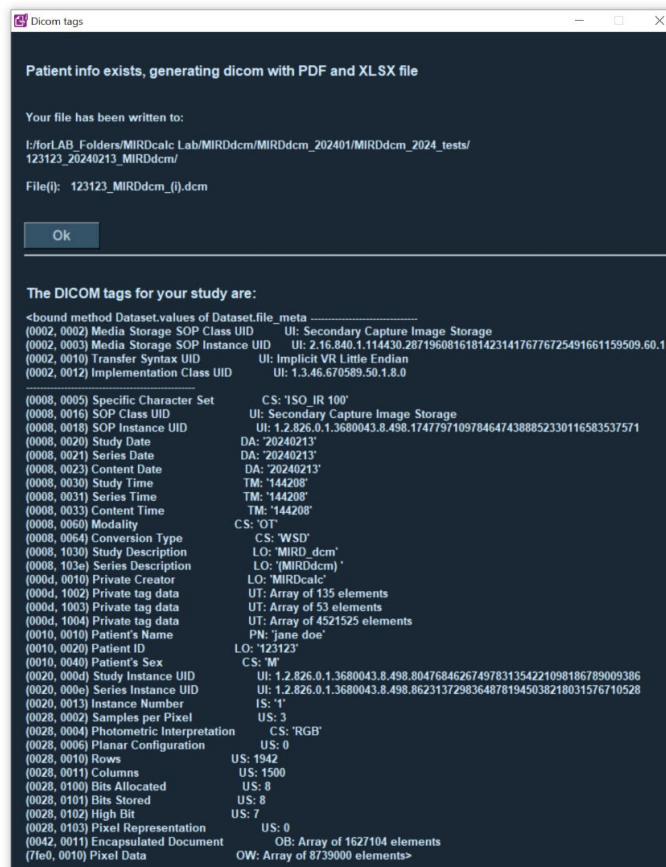
**DICOM tags:** The user can populate the subject specific DICOM tags manually, or by selecting an existing DICOM containing the subject’s information (Name, ID, study date, etc). If the user does not specify a series date it will default to today’s date in the format YYYYMMDD. The default series description contains MIRDdcm as a prefix so that the user will know that the DICOM contains stored data; the user may change this if they wish. Note that if a DICOM file is used to populate the fields, the resulting DICOM will be appended to that subject’s folder and will appear in the same location as the input DICOM when uploaded to medical imaging software.

**DICOM generation:** If a PDF is selected, a DICOM file will be generated for each page of the PDF unless the user selects the optional "Single File" checkbox. If this option is selected a single DICOM file will be generated; this DICOM will store all selected files in full, however, only the first page of the PDF will be viewable in medical imaging software. The “Single File” option significantly reduces the size of the output DICOM folder and is recommended for PDFs with many pages. If no PDF is selected and data files (CSV/XLSX and/or ZIP) are added, a default image will be inserted into the DICOM file as shown in Figure 4. This default image is also viewable in medical imaging software and will list the filenames of the stored CSV/XLSX and/or ZIP files in the MIRDdcm DICOM file.



**Figure 4.** Default image used when no PDF is selected. The stored CSV/XLSX and/or ZIP file names are displayed.

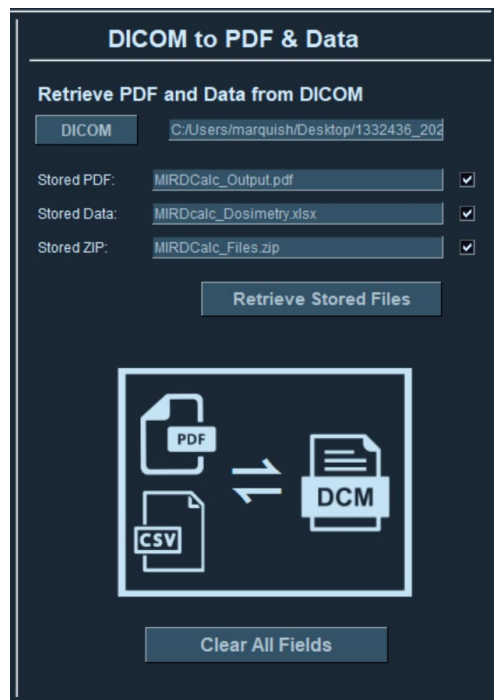
**DICOM generation cont:** If the “Single File” option is unchecked, the PDF, and CSV or XLSX files will be stored in full in each of the generated DICOM files; the ZIP file will only be stored in the DICOM file with index 0. The user can select the location where the output DICOM folder will be written to. The DICOM folder is generated with the name: **PatientID\_StudyDate\_MIRDdcm/** (e.g., for patient with ID 123456, a DICOM folder generated on 01/01/2022 will be named 123456\_20220101\_MIRDdcm). A pop-up window will appear showing the user the location of the DICOM folder and the DICOM tags (see Figure 5). The DICOM folder can be uploaded to HERMES, MIM, or any medical imaging software.



**Figure 5.** DICOM location and tags.

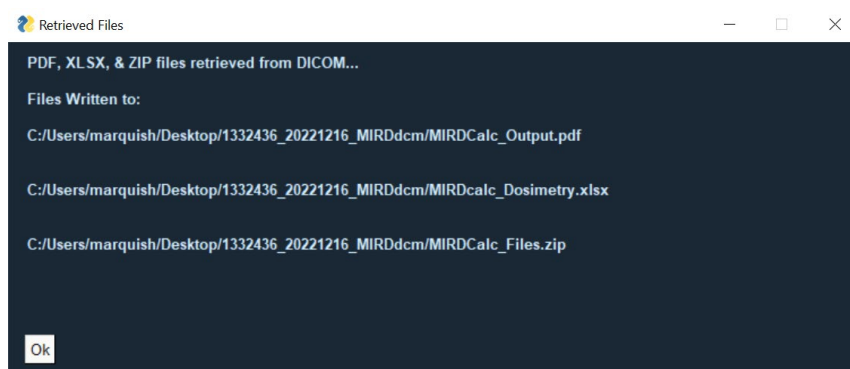
## DICOM to PDF & Data

The stored files can be retrieved using the module on the right of the single screen interface. It is important to note that when retrieving a DICOM from any medical imaging software, the index [i] may be removed from each of the file names. Considering MIRDdcm only stores ZIP files in the first MIRDdcm file (with index [0]) the user should look for the DICOM file with larger file size than the others - this will be where the ZIP file is stored. By selecting the DICOM file the user can see what files have been stored (figure 6). The default setting is to retrieve all stored files; however, the user can unselect certain files if they do not want to retrieve them.



**Figure 6.** Viewing and retrieving stored files using the MIRDdcm tool.

The files are retrieved by clicking "retrieve stored files". The stored files will be retrieved to the folder with the selected DICOM file. All stored files are retrieved exactly as they went in (with their original file names). When the user retrieves the selected stored files a popup window will appear showing the location where they are written to (figure 7).



**Figure 7.** Popup window showing the files the user wishes to retrieve, and the location where they are written to.



## Example use case

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MIRDdcm was used to generate a DICOM file containing a subject's nuclear medicine dosimetry report (generated using MIRDsoft.org's free MIRDcalc software). The MIRDcalc report and data were saved in the default PDF and CSV formats and MIRDdcm was used to store these files in DICOM format. The MIRDdcm generated DICOM file was then uploaded to a third-party vendor supported database and image viewing software. The MIRDcalc dosimetry report was able to be viewed using the default DICOM image viewer workflow on that software. The DICOM file was subsequently downloaded from the server and MIRDdcm was used to retrieve the files (PDF and MIRDcalc CSV save file) to their original state, demonstrating that MIRDdcm has utility for generating DICOM files that enable viewing of reports in medical imaging software, and for storing/retrieving relevant subject data. MIRDdcm operates locally and thus does not require online conversion, thereby ensuring data security and patient privacy.