**Features:**

This program scans .gsf (Generic Sensor Format) files inside a given folder, checks whether they contain backscatter data, and logs the results in a text file.

* Ensures the "text" folder exists (creates it if missing).
* Iterates through all .gsf files in the given directory.
* Checks for backscatter data using gsfRead().
* Logs results to text/gsf\_backscatter\_log.txt.
* Summarizes findings, displaying total checked files and missing backscatter counts.

**Requirements/Specifications:**  
**A. Install Required Dependencies**

For Windows

1. Install MinGW (GCC Compiler)
   * Download MinGW-w64 from: [Download](https://www.mingw-w64.org/downloads/)
   * Install it and add C:\MinGW\bin (or its equivalent) to the system PATH.
2. Install VS Code Extensions
   * Install C/C++ extension (ms-vscode.cpptools).
   * Install Code Runner extension (optional, for easy execution).

**B. Setting Up VS Code**

1. Open VS Code.
2. Install the C/C++ extension (ms-vscode.cpptools).
3. Install the Code Runner extension (optional).

**C. Writing and Compiling the Code**

1. Open VS Code.
2. Create a new folder for your project.
3. Inside the folder, create a file named check\_gsf.c.
4. Copy and paste the C code into check\_gsf.c.
5. Open the Terminal in VS Code (Ctrl + ~).

**D. Compiling and Running the Code**

**For Windows:**

gcc -o check\_gsf check\_gsf.c -lgsf

check\_gsf.exe C:\path\to\gsf\folder

**1. Header Files Included:**

* gsf.h is a library used to read and interpret .gsf files, which contain sonar data, including bathymetric and backscatter information.

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**2. Ensuring the "text" Folder Exists**:

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* The function checks whether a directory named **"text"** exists.
* If not, it creates it.
* Uses different mkdir commands for **Windows** (\_WIN32) and **Linux/macOS**.

**3. Checking for Backscatter Data in a .gsf File:**

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* Opens the .gsf file in read-only mode.
* Iterates through each record in the file using gsfRead().
* Checks if the record contains backscatter data (brb\_inten).
* Returns 1 (true) if backscatter data exists, otherwise returns 0 (false).

**4. Processing all .gsf Files in a Folder:**

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* Opens the specified folder containing .gsf files.
* If the folder can't be opened, it prints an error message.

**4.1 Creating the Log File**

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* Calls create\_text\_folder() to ensure the "text" folder exists.
* Opens a log file named "gsf\_backscatter\_log.txt" in write mode ("w").
* Write a header message inside the log file.

**4.2 Iterating Over .gsf Files**

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* Loops through all files in the directory.
* Skips the "." (current directory) and ".." (parent directory) entries.

**4.3 Constructing the Full File Path**

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* Constructs the **full path** to the file by combining the folder path and filename.
* Uses stat() to **get file properties**.

**4.4 Checking If the File Is a .gsf File**

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* Checks if the file is a regular file (S\_ISREG).
* Ensure the file has a .gsf extension.
* Calls has\_backscatter\_data(file\_path):

1. If backscatter exists, increments files\_with\_backscatter.
2. If missing, writes the filename to the log file.

**4.5 Writing Summary to Log File**

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* Writes summary statistics to the log file.
* Closes the log file and the directory.

**5. Main Function**

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* Accepts a folder path as a command-line argument.
* If no argument is provided, prints the correct usage format and exits.
* Calls process\_gsf\_folder(folder\_path) to analyze .gsf files.
* Prints a message to inform the user where to check the results.

**Summary of Functionality**

|  |  |
| --- | --- |
| **Feature** | **Description** |
| Ensures "text" folder exists | Creates the folder if missing |
| Iterates through all .gsf files | Reads each file in the given directory |
| Checks for backscatter data | Uses gsfRead() to check if the file contains brb\_inten data |
| Logs results to a file | Writes missing data files to "text/gsf\_backscatter\_log.txt" |
| Summarizes findings | Displays total checked files & missing backscatter counts |

Example Log File Output:  
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