## Operation manual of LTSA\_gui.exe

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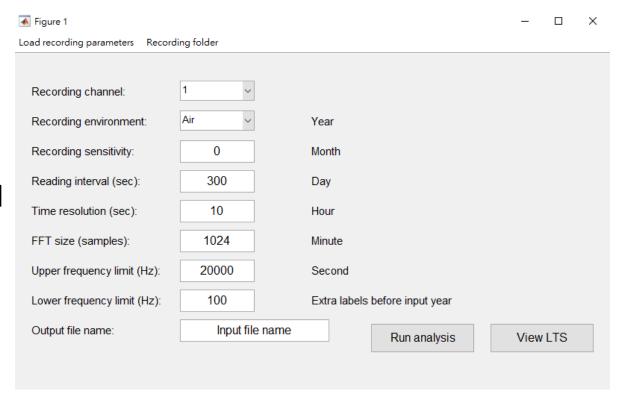
#### Preparation of using LTSA\_gui.exe

Install MATLAB Runtime R2017a (9.2)
<a href="https://www.mathworks.com/products/compiler/matlab-runtime.html">https://www.mathworks.com/products/compiler/matlab-runtime.html</a>

- Prepare your long-duration recordings within one folder
  - It must be way file!
  - Do not put recordings from different sites at the same folder
  - Beginning time of a recording should be stamped on the file name

#### Open the LTSA\_gui.exe

- Load recording parameters if necessary
- Press "Recording folder", a window will displayed to ask you select the recordings you want to analyze
- Go to the folder you have prepared, and then select any one recording
- The program will process all the recordings contain in the same folder
  - Not including subfolders



#### Control panel of LTSA\_gui.exe

Parameters of generating a long-term spectrogram

Load recording parameters Recording folder 1207984160.180528171002.way Recording channel: 123456789012345678901234567 Wat Recording environment: Year 12 13 Recording sensitivity: 0 Month 14 15 Reading interval (sec): 300 16 17 Day Time resolution (sec): 10 Hour 18 19 FFT size (samples): 1024 Minute 20 21 Upper frequency limit (Hz): 90000 Second 22 23 20 Lower frequency limit (Hz): Extra labels before input year 20 Output file name: Input file name Run analysis View LTS

Time stamp

information

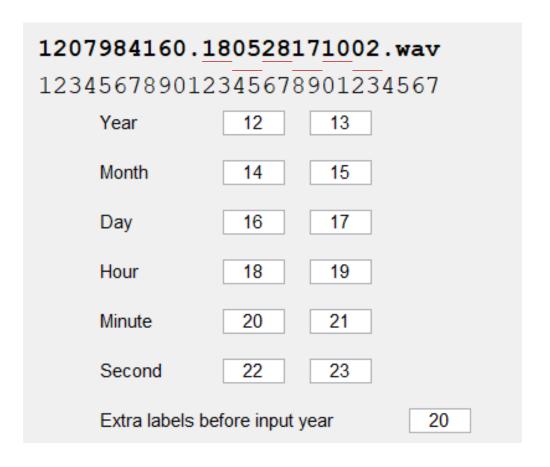
Name of output file

# Parameters of generating a long-term spectrogram

- Recording channel: 1 (left), 2 (right)
- Recording environment: Wat (underwater), Air (in air)
- Recording sensitivity: sensitivity for the entire system (dBV/pa)
  - If the sensitivity is unclear, please use 0 to measure the relative change
- Reading interval: duration of each recording clip in the duty cycle (second)
  - If a recording clip is too big (hours...), then you can try 60 second or 300 second.
- Time resolution: the desired time resolution of a long-term spectrogram (second)
  - No longer than the reading interval
- FFT size: number of samples in the spectral analysis
  - Frequency resolution will be: sampling frequency/FFT size
- Upper and lower frequency limits: the desired frequency range of a long-term spectrogram (Hz)
- Output file name

### Check the time stamps

- The program will get the beginning time of each recording clip from the file name
  - Make sure all the recordings in the same folder have the same format of time stamp
- Please enter the appropriate position of time labels on the file name :
  - Year, Month, Day, Hour, Minute, Second
    - Position of the first digit on the displayed file name e.g., [20]18 → 12th digit
    - Position of the final digit on the displayed file name e.g., [20]18 → 13th digit
  - Extra labels before input year
    - If the year stamp is not complete, e.g., 2018 → 18, then put "20" here



#### Run analysis

- Press the button of "Run analysis", then the program will process the entire folder and display the current progress
- Once the analysis has been done, three types of long-term spectrogram will be displayed
  - Median-based long-term spectrogram
  - Mean-based long-term spectrogram
  - Difference-based long-term spectrogram
- A mat file which contains all the results and meta-data will be saved in the folder of LTSA\_gui.exe

