

Proximeter Quick User Guide



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1. Introduction

The purpose of this document is to give guidelines for installation, use and integration of the Terabee Proximeter. The Quick User Guide describes the simple use of the Terabee Proximeter and the benefits of the Graphical User Interface.

1.1. Symbols explanation

The following symbols are used within the document:



This symbol indicates specific recommendations in order to run the device in the intended way.

1.2. Technical Specifications

Please refer to the Terabee Proximeter Specification Sheet for details.

1.3. Standard precautions

It is recommended to sanitize the Proximeter regularly. Do not spray liquids directly on the Proximeter and prefer using standard antimicrobial products.

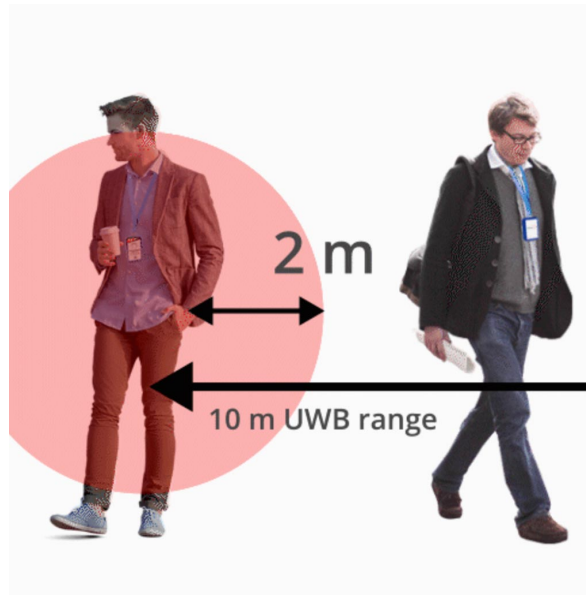
2. About Terabee Proximeter

2.1. Application overview



The system is based on a radiofrequency hardware kit consisting of multiple wearable devices.

It takes a couple of minutes to set up the system and start logging the encounters. In case of need, the log can be downloaded on a PC thanks to a graphical user interface developed by Terabee (see section Graphical User Interface).

Each worker wears a device and in the event of an encounter, they are alerted in real-time with haptic and audible feedback options. IDs and timestamps are logged on internal 14 day storage for further analytics.



An encounter is defined as: When 2 people are detected within a *threshold distance* (default value, 2 meters) for a duration of 30 seconds or more (*time threshold*), the product will register the IDs of the users, their distance to each other and the duration of the encounter. The encounter will end once the 2 people are further than the threshold range for more than 30 seconds (*Encounter timeout*).

-  *The minimum distance for an encounter is 50cm. Below this distance, the encounter will not be properly logged.*
-  *The threshold range, the time threshold and the encounter timeout are configurable parameters defined by the organisation.*

2.2. Advanced sensor networking

Advanced sensor networking means that each device constantly adapts to complex people dynamics as clusters form and dissipate. Each Proximeter is "multi-tasking" and able to connect at the same time with 50 other Proximeters and thus potentially log up to 50 encounters (50 seats) simultaneously.

Each Proximeter is constantly updating, and the advanced sensor networking means that, if an encounter has ended, one seat is available and the Proximeter can automatically start detecting a different encounter with that available seat.

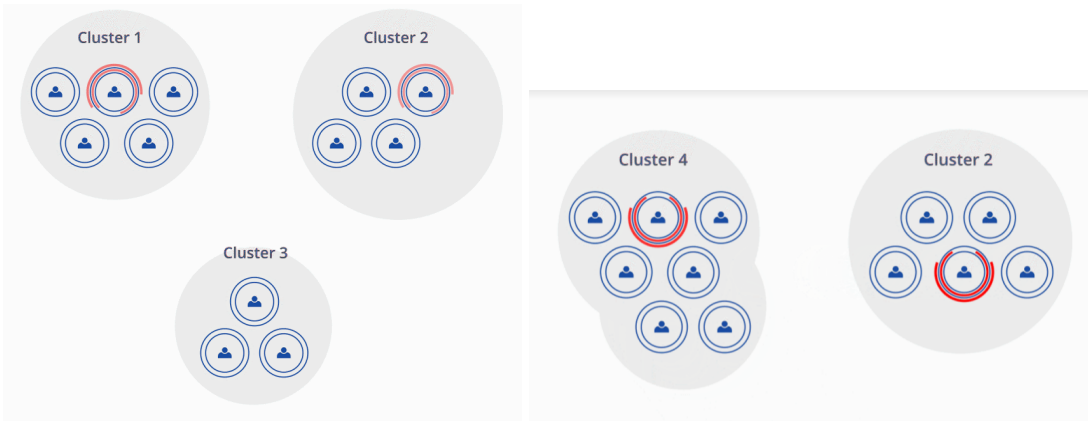


Figure - Advanced sensor networking

Thanks to the Encounter Timeout parameter, the Proximeter will remember an encounter for 30 seconds, keep it live and potentially resume that same encounter in case that the two people are within range again during those 30 seconds. This functionality applies to all encounters and at any time, meaning that other encounters are being logged at the same time.

2.3. Ultra Wide Band technology

The devices are based on Ultra wideband (UWB) Time-of-Flight technology which is based on radiofrequencies. The devices communicate wirelessly to each other under specific radiofrequencies, and the distance between devices is calculated from the time needed for the messages' exchange.



*The Ultra wideband applications are subject to regulations that vary depending on the country. **The Proximeter can be used in the European Union, the United States, Canada, Norway, Switzerland and the United Kingdom.** Countries not listed above may also approve this product, please contact us for further information.*

2.4. Compliance

IMPORTANT: Contains FCC ID: 2AQ33-DWM1001. This equipment complies with Part 15 of the FCC Rules.

IMPORTANT: Contains IC: 23794-DWM1001

3. Getting started

After unpacking the sensors, please charge the device to its maximum capacity (See section [Battery charging](#) for more information).

The device operates with one button and 2 LEDs, as well as a micro USB port to charge the device, as depicted in the Figures below. From the moment it is turned on, the device is operational and able to discover other devices within the range of operation.



Figure - LEDs and Button



Figure - MicroUSB port

3.1. Turn ON

The device turns on simply by pressing the button on the side as indicated in the picture. After pressing one time, the Status LED will turn green after one second as shown in the Figure below.



Figure - Device Turned ON

If LoRa network capability is enabled on the device, it will start automatically connecting to the network and once connected, the Status LED will start blinking green. The device is now ready to send stored data to the LoRa gateway at defined intervals.

3.2. Turn OFF

The device turns off by simply pressing the button on the side.

3.3. Low battery alarm

The device will indicate low battery status by blinking the Status LED in red as shown in the Figure below. **When blinking, the device will keep recording encounters for 2 hours.**



Figure - Device with low battery



Whilst in low battery mode, it is not recommended to switch the device OFF until you have finished using it for the day. In this state, the device will not switch ON again until the battery level reaches a safe level of charge.

3.4. Battery charging

The fully charged Proximeter will keep working for around three working days but the user is recommended to charge the battery on a daily basis, like a mobile phone. Charging is done by inserting the microUSB connector as depicted in the following Figures. A mobile phone micro USB 3.0 charger will be able to charge the device (**5V, 1A** is advised). It is NOT suggested to use the USB port of a computer for the recharge because the charging time could be much longer. While charging, the LED next to the button will become red, as in the picture below.



If the charging is not completed after 12 hours, this means that the charging process is limited by the charger in use. Please use another charger with higher current capability. All modern mobile phones chargers work at 2A or more, and these are recommended for charging the device.



Figure - Device being charged

When the charge is complete, the LED near the button will turn off, as per picture below.



Figure - Device completely charged (no LEDs ON/blinking)

N.B: Poor quality charger or cable (especially long ones) will greatly affect the charging time.

4. Visual notifications

Two LED indicators are available. The table below shows the correct behaviour of the LEDs during normal operations.



Figure - LED designator

Table - LED indicators - normal operation

LED designator	Sequence	Description
Status LED	Steady GREEN	Device is ON
Status LED	Blinking GREEN	Device is connected to LoRa network
Status LED	Blinking RED	Low battery
Status LED	Steady RED	Failed initialization
Charging LED	Steady RED	Device is being charged
Charging LED & Status LED	OFF	<ol style="list-style-type: none"> 1. Device is OFF 2. If connected to a charger, device is fully charged

5. Graphical User Interface

A single Graphical User Interface provides different accesses that allow different configurations. All Access modes are protected with a password and the password is always requested when trying to configure a device or download the data. The two access modes presented in this document are:

- **End user:** access available to all the users of the Proximeter
- **Administrator:** access restricted to the people responsible to set up the application on the client side

If you are the administrator of your organisation, please go directly to section 5.3: Use of the GUI as Administrator.

The Graphical User Interface for Windows 10 can be downloaded via this link [Proximeter GUI](#)

5.1. Installing the GUI

To install the GUI please use the following instructions:

- Unzip the archive that was downloaded
- Navigate in folder "release_1017"
- Double click the file TerabeeProximeter.exe
- Allow Windows to install the GUI and follow the instructions of the Windows Installer.
- The GUI is now available for use

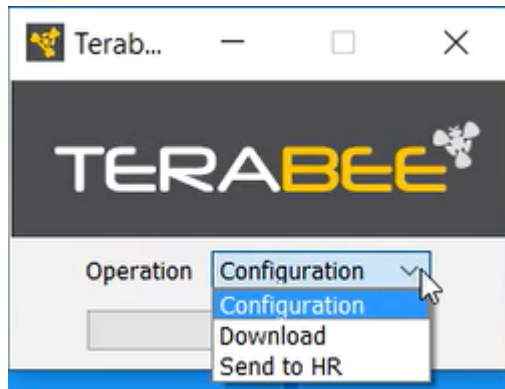
5.2. Use of the GUI as a End user



To use the Graphical User Interface, the Proximeter must be powered on, and the status LED should be Green. The Proximeter shall be connected to the computer via the micro USB cable provided by Terabee.

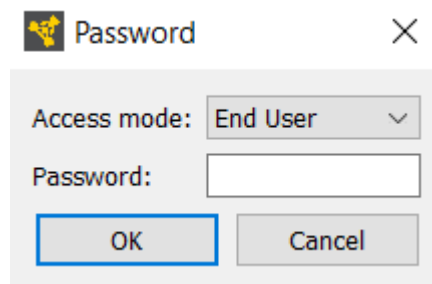
The standard graphical user interface provides 2 main functionalities that are available from the Home screen:

- Configuring the basic parameters of the device
- Downloading encounters data into a .csv report



5.2.1. Basic configuration of the Proximeter

A password will be requested to access the configuration dashboard and to download the encounters data. Select the "end user" access mode and enter the password that has been provided by Terabee.



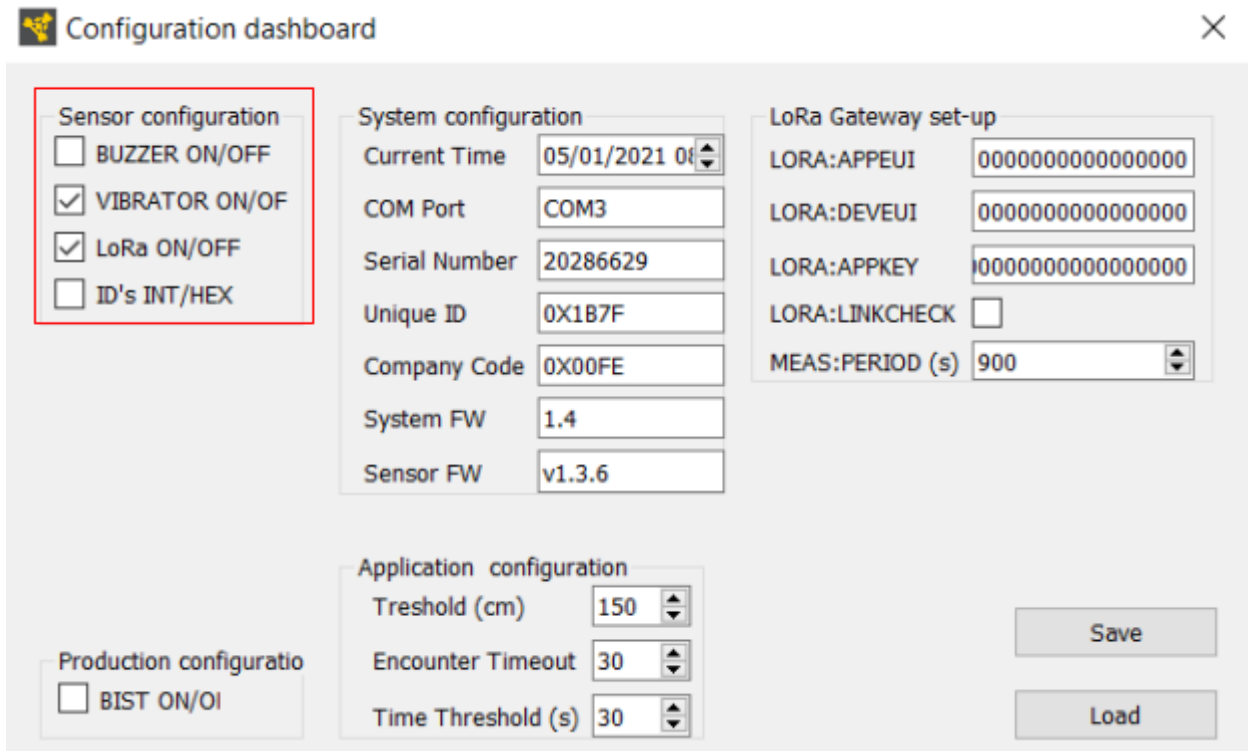


Figure - Configuration dashboard

The End User is able to modify the parameters related to the Sensor configuration - selection in red in the screenshot above - but cannot modify the other parameters that are restricted to the Administrator access.

All the parameters are visible to the End User for information and better understanding of the application.

Sensor configuration

The Terabee Proximeter integrates a buzzer and vibration to provide real-time alerts to the user. Those notifications can be activated/deactivated by simply checking the box associated to the alert:

- BUZZER ON/OFF: when the box is checked, the device will emit a sound when an encounter occurs
- VIBRATION ON/OFF: when the box is checked, the device will vibrate when an encounter occurs
- LORA ON/OFF: when the box is checked, the device can connect to a LoRa network
- IDs INT/HEX: when the box is checked the device "Unique ID" and "Company Code" will switch from Hexadecimal format to Decimal format. Note that, when downloading data, the .csv file will output device ID in Hexadecimal or Decimal in accordance with the parameter set.

The "Save" button uploads the modification inside the Proximeter device.



The other parameters from the configuration dashboard are visible to the End User but can't be modified with the "End user" access mode. Only the administrator can modify the rest of the parameters.

5.2.2. Downloading the encounters data as a end user

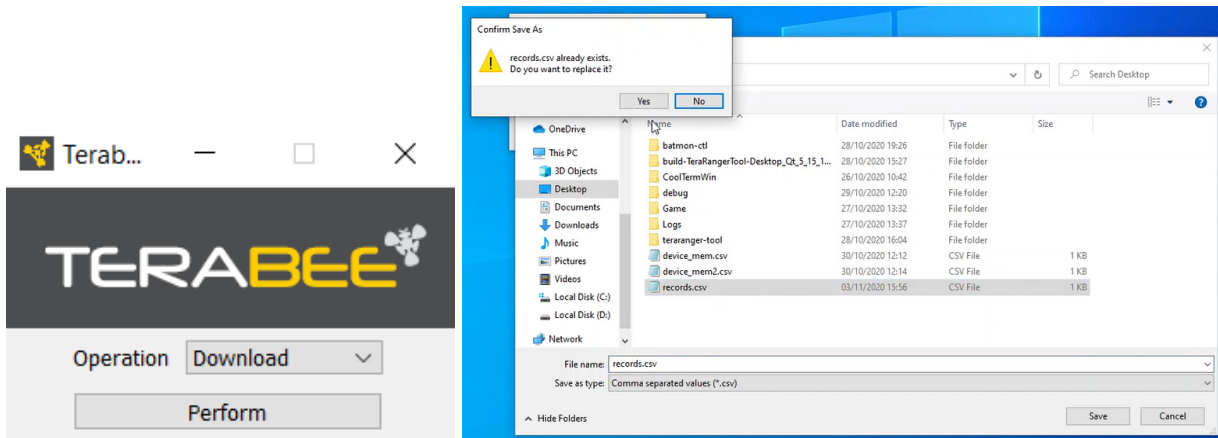


Figure - Download procedure

The encounters data can be directly downloaded from the Home screen. To do so, follow the listed instructions below:

- Select "Download" in the drop-down list & Click the "Perform" button
- Select the "end user" access mode and enter the password, then Click "Ok"
- Enter a filename for saving and select ".csv" as type of file
- Click the "Save" button

The encounters data from the Proximeter is now available directly in the saved .csv file.

5.3. Use of the GUI as Administrator



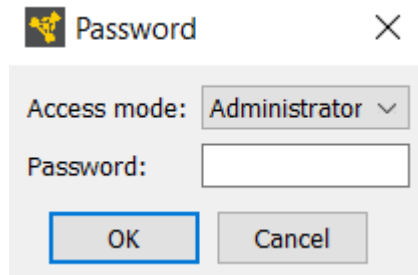
The administrator access of the Graphical User Interface is available for download via this link: [GUI DOWNLOAD](#)

The standard graphical user interface provides 2 main functionalities that are available from the Home screen:

- Configuring the parameters of the device
- Downloading encounters data into a .csv report

5.3.1. Configuration of the Proximeter

A password will be requested to access the configuration dashboard and to download the encounters data. Select the "Administrator" access mode and enter the password that has been provided by Terabee.

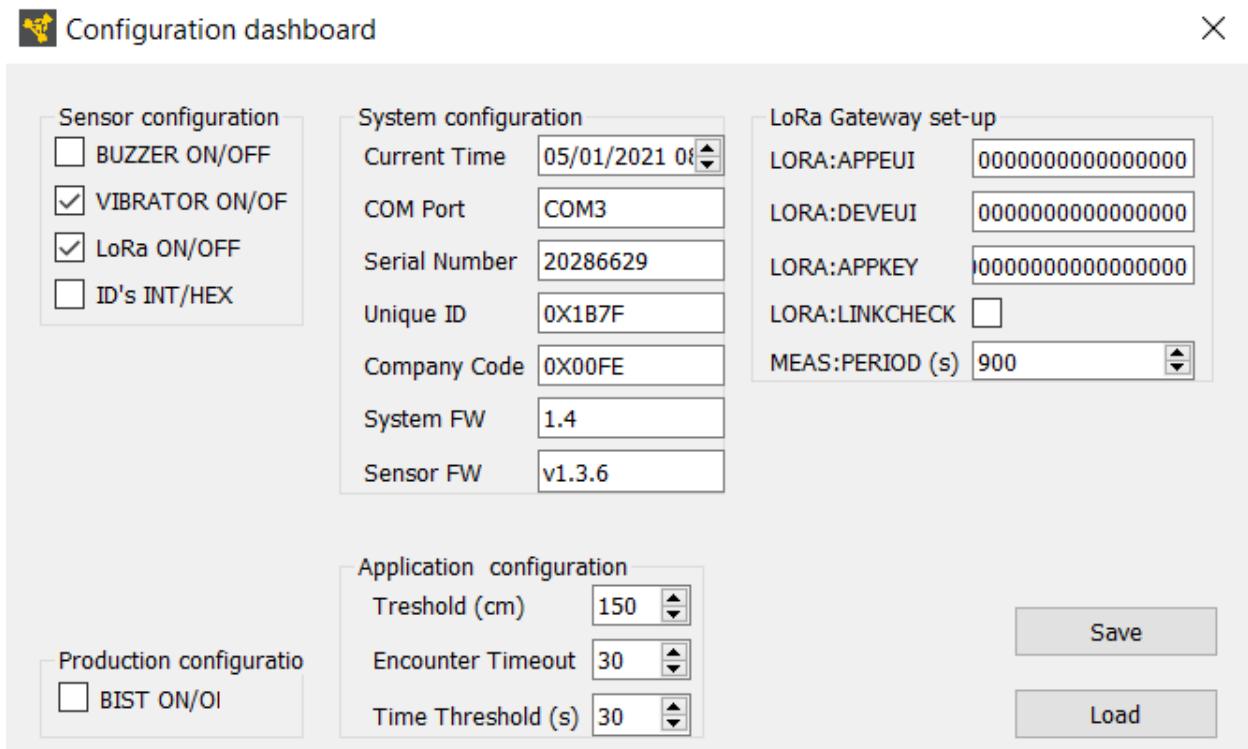


A dialog box titled "Password" with a close button (X) in the top right corner. It contains two fields: "Access mode:" with a dropdown menu set to "Administrator", and "Password:" with an empty text input field. At the bottom, there are two buttons: "OK" and "Cancel".

System configuration

This window provides information about the device (serial number, the com port connected and the device unique ID used to log encounters). The date and time of the Proximeter are automatically updated with the date and time of the computer, so that the .csv reports are properly dated.

Application configuration



A configuration dashboard window titled "Configuration dashboard" with a close button (X) in the top right corner. It is divided into several sections:

- Sensor configuration:** Includes checkboxes for "BUZZER ON/OFF", "VIBRATOR ON/OFF" (checked), "LoRa ON/OFF" (checked), and "ID's INT/HEX".
- System configuration:** Includes fields for "Current Time" (05/01/2021 08:00), "COM Port" (COM3), "Serial Number" (20286629), "Unique ID" (0X1B7F), "Company Code" (0X00FE), "System FW" (1.4), and "Sensor FW" (v1.3.6).
- LoRa Gateway set-up:** Includes fields for "LORA:APPEUI" (0000000000000000), "LORA:DEVEUI" (0000000000000000), "LORA:APPKEY" (0000000000000000), "LORA:LINKCHECK" (checkbox), and "MEAS:PERIOD (s)" (900).
- Application configuration:** Includes fields for "Threshold (cm)" (150), "Encounter Timeout" (30), and "Time Threshold (s)" (30).
- Production configuration:** Includes a checkbox for "BIST ON/OI".

At the bottom right, there are "Save" and "Load" buttons.

Figure - Configuration dashboard

This window gives the possibility to the administrator to set the parameters of the application, on each device prior to distribution to employees:

- **Threshold (cm):** set the maximum distance for encounters logging in cm. This value shall be higher than 50cm.
- **Time threshold (s):** set the maximum time of interaction before it is logged as an encounter. This value shall be higher than 1 second.
- **Encounter timeout (s):** set the time to end the encounter, once the devices are out of respective range. This value shall be higher than 1 second.

LoRa Gateway set-up

These parameters allow the administrator to insert parameters for the LoRa gateway directly from the GUI and configure the LoRa communication between the device and the gateway.

These parameters are not necessary if no LoRa infrastructure is available on the user's site.

Before exiting the configuration dashboard, click the Save button to save the configuration in the device.

6. Computing the data

The data is logged in the .csv file, and each encounter follows the structure below:

My_tag_id,RF_tag_id>Contact_duration,Date, Time

```
My_tag_id,RF_tag_id>Contact_duration,Date, Time
31060,35750,100,2020-11-05,"15:35"
31060,35750,13,2020-11-10,"17:12"
```

Figure - Example of .csv file with two encounters logged (Decimal format)

- *My_tag_id*: this is the Unique ID of the device
- *RF_tag_id*: this is the Unique ID of the encountered device
- *Contact_duration*: this is the encounter's duration, counted in multiples of "Threshold time" parameter. (e.g: for a "Threshold time" set to 30s, a 1 minute encounter will lead a "Contact_duration" of 2)
- *Date*: date output following this format: "YYYY-MM-DD"
- *Time*: time output following this format "HH:MM" (HH from 00 to 23)

6.1. Import of .csv file

As the data is logged into a .csv file it can be imported in any spreadsheet application (Microsoft Excel, Google Spreadsheet, OpenOffice, LibreOffice,...). In that case, each encounter will be logged in a separate line of the spreadsheet, and the information of each encounter will be displayed in separate columns.

The spreadsheet format allows the person doing the data processing to use the data in a simpler way and apply filters to the encounters. Tracing the encounters at risk is thus made easier.

	A	B	C	D	E
1	My_tag_id	RF_tag_id	Contact_duration	Date	Time
2	31060	35750	3	2020-12-09	10:31
3	31060	35750	1	2020-12-10	14:14
4	31060	35750	0	2020-12-10	14:16
5	31060	35750	1	2020-12-10	14:18
6	31060	35750	0	2020-12-10	14:19
7	31060	35750	0	2020-12-10	14:21
8	31060	35750	1	2020-12-10	14:22
9	31060	35750	0	2020-12-10	14:24
10	31060	35750	0	2020-12-10	14:25
11	31060	35750	1	2020-12-10	14:27

Figure - Example of .csv data import on Google Spreadsheet