AreConfig

v. 2.2

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1. Introduction

AreConfig is a program which allows changing options and calibration of flight computer "Arecorder". Program exists in two versions - user version and calibration version.

AreConfig features:
— changing all four parameter sets - main parachute deployment altitude, launchpad height, delay between burnout of first stage engine and ignition of second stage engine and rocket descending velocity at which emergency main parachute deployment will happen and disabling this algorhitm (when velocity is set to "0"),
— testing detection and firing fuses in controlled environment,
— changing owner's name and phone number,
— readout measurements from accelerometer, pressure sensor, temperature sensor, voltage supply and calculated upon accelerometer measurements, angle between Arecorder and ground plane,
— calibration of accelerometer and temperature sensor (only calibration version),
— changing serial number (only calibration version).
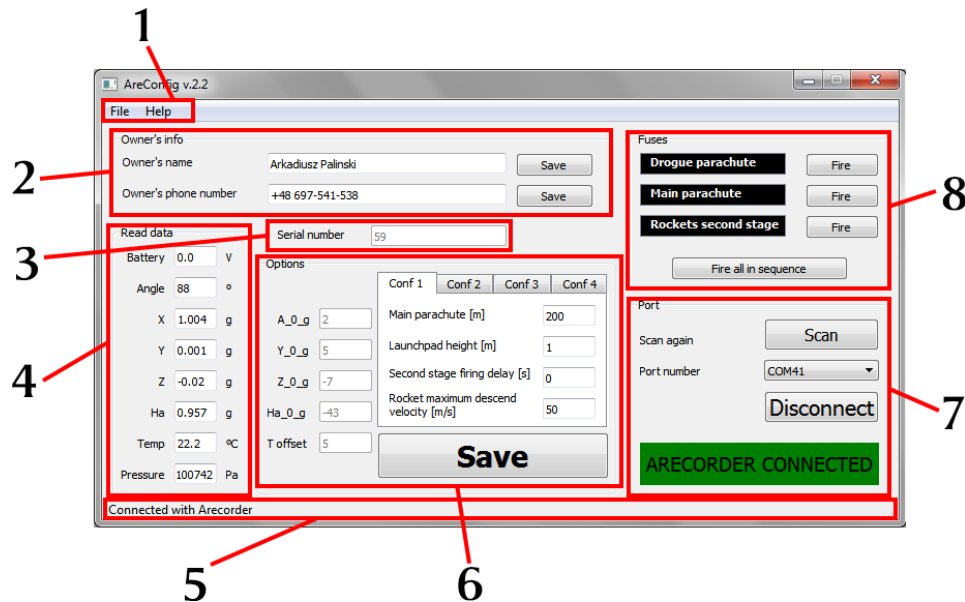
2. Interface description

Figure 2.1. Description of various parts of interface.

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2.1. Main menu

Because in AreConfig everything is being done from application level, there are almost no options in main menu. In menu *File* there is just option *Quit*, which quits the program. In menu *Help* there is option *Help*, which displays instructions about how to connect with Arecorder and option *About*, which displays information about Areconfig program, it's version, mail address to it's creator and website addresses dedicated to Arecorder and AreConfig.

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2.2. Owner data

In section *Owner data* user can change both name and phone number of Arecorder's owner. These data are written at the beginning of every measurement file written by Arecorder. In the *Owner's name* field you can use only latin alphabet.

2.3. Serial number

In this section Arecorder's serial number is presented.

2.4. Data read from Arecorder

In this section data read from Arecorder are presented:
— Battery - voltage level on battery powering Arecorder (during configuration Arecorder is powered through computer USB port and battery doesn't have to be connected, hence measured voltage level of 0 V),
— Angle - calculated angle between Arecorder and ground plane,
— X - acceleration along Arecorder axis of $\pm$ 24 g ccelerometer,
— Y - acceleration at axis across Arecorder's width of $\pm$ 24 g accelerometer,
— Z - acceleration at axis from top to bottom part of Arecorder of $\pm$ 24 g accelerometer,
— Ha - acceleration along Arecorder axis of $\pm$ 80 g accelerometer,
— Temp - temperature,
— Pressure - atmospheric pressure measurement.

2.5. Status bar

Status bar presents additional information about connection with Arecorder.

2.6. Options

In this section user can change configuration of main parachute deployment altitude, launchpad height, delay between burnout of first stage engine and ignition of second stage engine and rocket descending velocity at which emergency main parachute deployment will happen or disable the algorhitm (by setting velocity to "0"). Configurations sets can be switched by clicking on tabs in this section.

Calibration version also enables changing of calibration parameters of accelerometers and temperature sensor. User version can only view these values.

2.7. Connection with Arecorder

Connection with Arecorder section. In this section there is *Connect/Disconnect* button, port scan button, port list, at which program can connect to and label showing present connection status.

2.8. Fuses

This section shows status of fuses connected to Arecorder's fuse outputs. In this section there are also buttons to fire selected fuses and a button to fire all fuses in sequence.

WARNING - Fuses are connected only to battery voltage, USB port voltage powers other parts of Arecorder. User needs to connect Arecorder to battery in order to test fuses - including both connection testing and firing.

3. Description of operation

3.1. Connecting Arecorder to PC

User should connect Arecorder to PC through USB cable first and then turn on AreConfig software. During connection Arecorder shouldn't be connected to battery - if Arecorder detects power supply from battery, it will assume being in a rocket. Arecorder turns on communication only when there is no power supply from battery - the only case Arecorder can work without battery is when it is connected to PC through USB cable. After connecting Arecorder to PC, battery can be connected, Arecorder will not switch from communication mode without power off.

In AreConfig program user should choose port, to which Arecorder is connected. Usually correct port should be selected right away after AreConfing is started, but if it's not the case or program was started before Arecorder connection, user shoulc click *Scan* button and try to connect with correct port. Ussually there should be just one detected port.

> If there are more than one available ports on the list, user can click right mouse button on *Computer* and from context menu choose *Properties*, next *Advanced system settings* and in tab *Hardware* click button *Device manager*. From the lisst choose *Ports (COM & LPT)* - port at which Arecorder is connected will have name beginning from *USB Serial Port*.
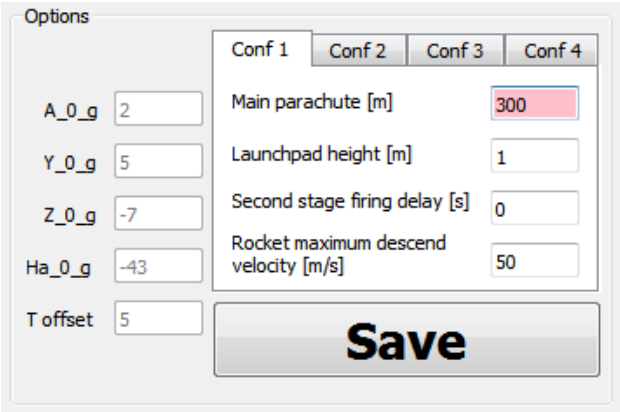
Next user should click *Connect* button. Arecorder will be automatically detected and will be connected with AreConfig program.

3.2. Programming and viewing parameters

When AreConfig connects with Arecorder, AreConfig will automatically read all settings and display them in suitable fields. It happens every time user clicks button *Connect* and AreConfig successfully connects with Arecorder, no matter if user have done any changes. All changes will be lost unless user saves the changes by clicking *Save* button before.

After connection is established user can make changes in parameter sets or owners name or phone number. When user make changes in some field background of this field will change to light red to signal changed and unsaved value. Changes will be saved after user clicks appropriate *Save* button.

Fields *Owner's name* and *Owner's phone number* have their own *Save* buttons.

Figure 3.1. Changed altitude at which main parachute should be deployed option.

Saving changes means sending changed values to Arecorder, saving them on Arecorder and sending new values, read from Arecorder's memory back to Are-Config. AreConfig checks if received values are identical with those sent to Arecorder, which means they are physically written correctly. If the values are different AreConfig will pop-up information that not all sent data were correctly written; data written with errors will still have light red background, while those written correctly will have background changed to white. In that case user should try again to save changes.

In section *Read data* user can see live view from data read from Arecorder. Data from accelerometers are averaged to increase readability of presented data. Other data are not processed by AreConfig and presented just the way there were read from Arecorder

3.3. Fuse testing

Before fuse testing user should make sure that Arecorder is connected to external power supply - USB power is not enough - see 2.8.

When Arecorder detects fuse connected, appropriate label background will become red.

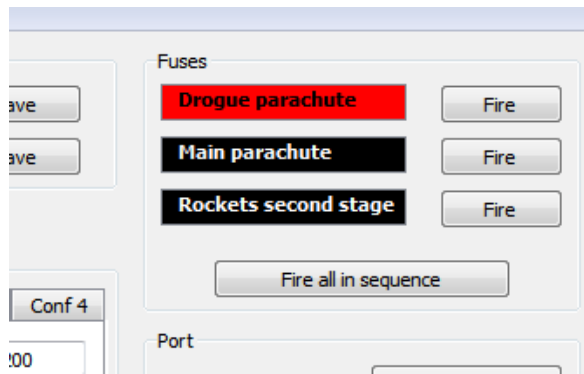In this section it is possible to order Arecorder to fire a fuse.

Figure 3.2. Detected fuse connected to drogue parachute.

WARNING - User shouldn't fire a fuse without protection from shrapnel after fuse firing. Such simple protection could be e.g. putting fuse inside empty plastic bottle.

To order Arecorder fire a fuse, user should click button *Fire* next to label of chosen fuse. AreConfig will ask for confirmation of firing fuse showing again name of the fuse connection. After acknowledging, fuse will be fired immediately.
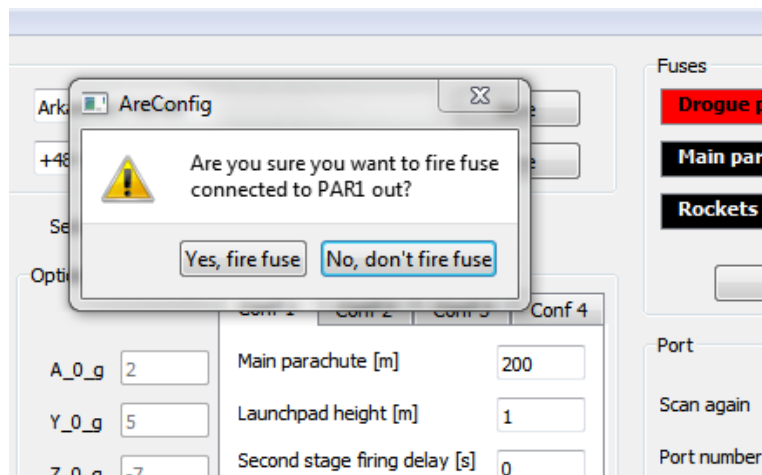

Figure 3.3. Pop-up awaiting to acknowledge fuse firing.

In this section there is one more button - *Fire all in sequence*. This button is for firing all fuses with small delays one after another. After clicking it Areconfig will ask for confirmation of firing all fuses and after acknowledging, Arecorder will fire fuses one after another with 100 ms delays betweenn them.

A. History of changes

2016.07.03

— Initial release of english version of manual.