

Medjil User Guide

Version: 25-2-2025



1.	Intro	oduction	2
2.	Med	jil Home Page	3
3.	Sign	up, Login and User Profile	4
3.	.1.	Sign up	4
3.	.2.	Login	5
3.	.3.	User Profile	6
4.	Dash	nboard	7
4.	.1.	Instrument Register	8
4.	.2.	Calibration Sites	9
5.	Staff	Calibration	. 10
5.	.1.	Staff Calibration	. 10
5.	.2.	Leveling Staff Registry	. 12
5.	.3.	Staff Calibration Procedures	. 12
6.	EDM	l Calibration	. 15
6.	.1.	EDMI Calibration	. 15
6.	.2.	Interlaboratory Comparisons	. 19
6.	.3.	Uncertainty Budgets	. 20
6.	.4.	Report Endnotes	. 22
7	Resc	nurces	23

1. Introduction

Medjil is a survey instrumentation calibration portal (Medjil Portal) developed by Landgate (the Western Australian Land Information Authority) in collaboration with the Intergovernmental Committee on Surveying and Mapping (ICSM). It allows rigorous calibration and reporting of:

- Barcode staff using staff calibration range facilities
- Staff ranges (only available to verifying authority¹ users)
- EDM Instrumentation (EDMI; EDM and prism) using standardised EDM Baselines
- EDM Baselines using standardised instruments (only available to verifying authority users)

establishing legal traceability of user's instruments to the national standard of length provided by the National Measurement Institute (NMI).

This user guide provides a quick reference on the functionality and operation of the Medjil Portal. For more detailed documentation refer to the following calibration guides and technical manuals:

- EDMI Calibration Guide
- Barcode Staff Calibration Guide
- Survey Instrumentation Calibration Technical User Manual
- Staff Calibration Technical User Manual

available under the Resources tab on Medjil's home page (cf. section 2). For information on Medjil development and contributions, please refer to the GitHub repository (https://github.com/Landgate/Medjil).

Access Medjil here: https://medjil0.lb.landgate.wa.gov.au

_

¹Verifying authority users have additional permissions when using the Medjil portal. Please contact a Landgate staff member to enable these permissions. (email geodesy@landgate.wa.gov.au)

2. Medjil Home Page

The Medjil home page (see Figure 2.1) allows direct access to the portal's main functions enabling instrument calibrations and management of all related information. Before using the full functionality of Medjil, users need to sign up and login (see section 3).

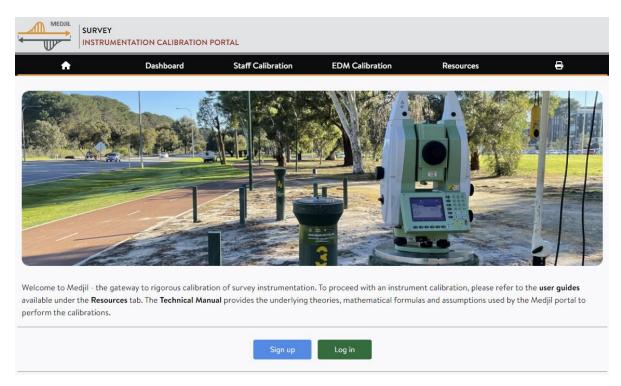


Figure 2.1: Medjil home page.

Main menu options on Medjil's home page

lackHome button to return to Medjil's home page. Dashboard Access the Instrument Register and Accreditation Calibrations of your company and list of available Calibration Sites (see section 4). Staff Calibration Perform levelling Staff Calibrations and access the Levelling Staff Registry containing calibration records of your company (see section 5) Perform EDM Instrumentation Calibrations and Interlaboratory Comparisons **EDM Calibration** of calibration results, input Uncertainty Budgets and customise Report Endnotes included in calibration reports (see section 6). Resources Access Calibration User Guides and Technical Manuals (see section 7). 8 Print the current screen view or reports.

3. Sign up, Login and User Profile

3.1. **Sign up**

Step 1:

New users of the Medjil Portal need to sign up (register) before being able to use its full functionality. Existing users of Medjil as well as users that previously signed up to Landgate's Online Staff Calibration portal can directly login (see section 3.2).

To sign up, select on Medjil's home page, which opens the interface shown in Figure 3.1 below.

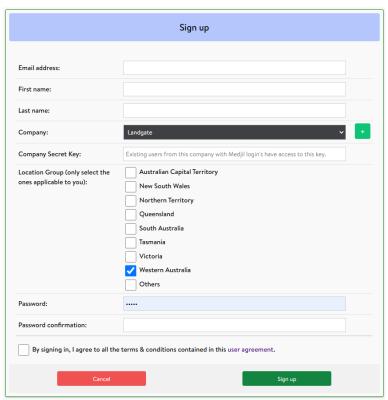


Figure 3.1: Sign up interface.

On the sign up form complete the following information:

Email address: Enter your e-mail address associated to your account.

First and last name: Enter your first and last name.

Company: Select your company from the drop-down list if already

registered. You will need to enter your Company Secret Key

issued at first sign up.

Otherwise, select and enter your company's name and a short abbreviation. Your Company Secret Key will

automatically be generated for you.

Password & confirmation: Create and confirm a password for your user account.

Before submission, confirm that you read and agree to the terms & conditions, which can be viewed following the *user agreement* link (see Figure 3.1).

Step 2:

After successful submission of your sign up details an e-mail is sent to the nominated e-mail address containing an activation link to confirm your registration. To complete the sign up click the link to activate your account. After successful activation you will be directed to the Login interface.

Note: During your first login you will need to setup Multi Factor Authentication (MFA) using the Authenticator App (see section 3.2).

3.2. Login

To login as a registered user select on Medjil's home page to open the interface shown in Figure 3.2 and enter your e-mail address and password used to sign up.

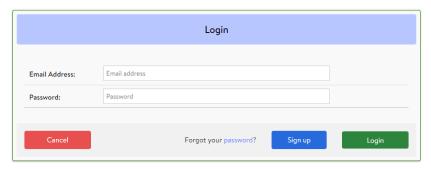


Figure 3.2: Login interface.

Use the *Forgot your password* link to reset your password. You will be prompted to enter the e-mail address used to sign up, which will sent an e-mail containing a link to reset your password.

First Time Login - Setting up MFA

During first time login you will be presented with a QR code and instructions to set up MFA (see Figure 3.3). For the setup, open an Authenticator App (either Microsoft Authenticator or Google Authenticator), select add a new account and scan the QR code. This will create a new account called Medjil – Survey Instrument Calibration linked to your nominated e-mail address. Important, do not scan the QR on your device camera and click the link but use the Authenticator App.

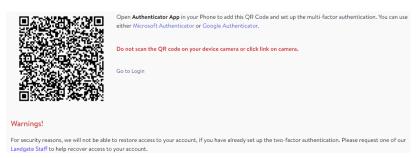


Figure 3.3: Example of QR code to setup MFA.

Once MFA has been setup go back to the login interface either selecting the link next to the QR code or on Medjil's home page for a normal login using MFA (see below).

Login - Using MFA

After submission of your user details through the login interface (see Figure 3.2) you will be prompted to enter a One Time Password (OTP) code (see Figure 3.4) created through the

Authenticator App. To access the OTP code open the Authenticator App and select the Medjil account. Use the generated OTP code to complete your login.

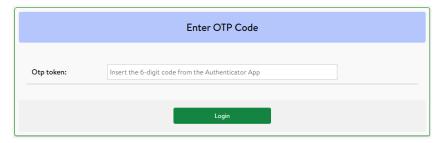


Figure 3.4: OTP input interface.

3.3. User Profile

Once logged in, your first name will be shown as the current user in the top-right corner of the webpage (see Figure 3.5). Expand the drop-down menu to view or edit your user profile details (e-mail and company) or view the list of all company users (see Figure 3.5 below). Use the action button to edit your user profile.

Note: Any change requires confirmation with the company secret key.

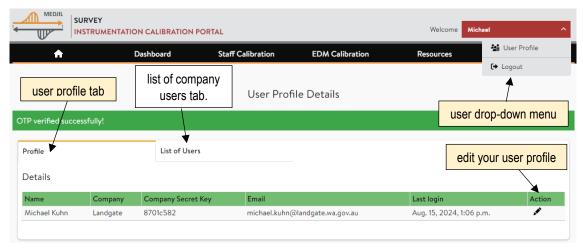


Figure 3.5: User profile details.

4. Dashboard



Figure 4.1: Dashboard drop-down menu

The *Dashboard* manages your company's instrument register, stores EDM accreditation certificates and provides information on available calibration sites. Any instrument used during a calibration must first be added to the instrument register and relevant specifications defined. Use the dashboard drop-down menu (see Figure 4.1) to access the following areas:

Instrument Register	Repository of your company's instrument records and related calibration certificates (see section 4.1).
Accreditation Certificates	Repository of EDM accreditation certificates for selection during EDM baseline calibrations (see section 4.2). This functionality is only utilised by verifying authority users.
Calibration Sites	Repository of information on all available EDM calibration baselines and staff range calibration sites (see section 4.3).

Transfer of existing records:

Users of Landgate's Online Staff Calibration portal will have records migrated to Medjil.

Records from the Baseline.exe suite of software can be transferred to the dashboard with the assistance of Landgate staff. Please contact one of our Landgate staff to request assistance. geodesy@landgate.wa.gov.au

4.1. Instrument Register

The *Instrument Register* menu allows the creation and management of the instrument types listed in the left-hand menu shown in Figure 4.2. For each instrument type up to three tabs can be selected to add or edit records of the model and its manufacturer specifications, instrument and related calibration certificate.

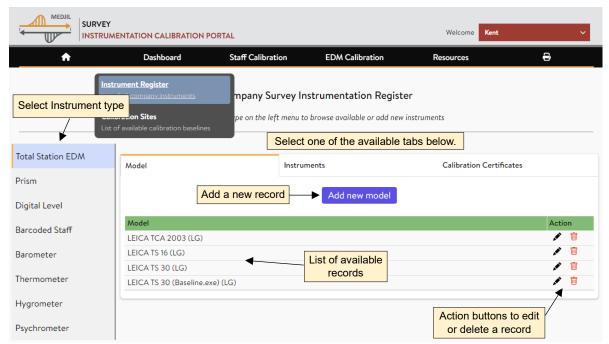


Figure 4.2: Example of a company total station EDM register.

To add or edit a record in the instrument register, select the instrument type from the left-hand menu, then select one of the available tabs and specify the following information.

Wodel

Use the Add new model button to open the input interface to create a new record. Specify make (manufacturer), model and owner (custodian). For each model provide the manufacturer specifications. Note, for EDM instruments a look-up table can be used to extract common manufacturer specifications. For more detailed information use the

information button 🛈 to refer to the technical manual.

Use the Add new instrument button to open the input interface to create a new record. For each instrument select the model (once added), specify the instrument number (e.g. serial number) and owner (custodian). You can also upload a photo for each instrument. Note, if the model has not been specified you can use the add button to directly go to the "Add

new model" interface (see above).

Calibration
Certificates

Once a successful calibration of an instrument has been performed the generated calibration certificate can be uploaded to the company's repository. Use the Add new certificate button to open the input interface to create a new record for calibration certificates issued from external sources.

Under each tab a list of existing records is displayed (see Figure 4.2). Use the action buttons and to edit or delete a record.

4.2. Calibration Sites

The *Calibration Sites* menu provides information on all EDM Baselines and Staff Calibration Ranges currently available (see Figure 4.4).

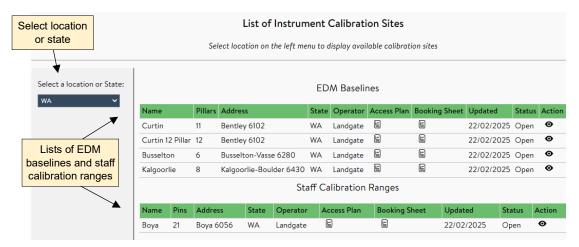


Figure 4.4: List of Instrument Calibration Sites.

Use the drop-down menu on the left-hand side to select a location or state to list all available calibration sites. For each calibration site an access sketch and booking sheet is provided. You should check the current status (see last column of the lists) before visiting any calibration site.

Note: Only verifying authority users can add, edit and delete calibration sites while 'normal' users can only view the details of each calibration site.

5. Staff Calibration



Figure 5.1: Staff Calibration drop-down menu

The *Staff Calibration* area is used to perform calibrations of barcoded leveling staffs and store company staff calibration certificates. Use the *Staff Calibration* drop-down menu (see Figure 5.1) to access the following areas:

Staff Calibration	Start a new barcoded leveling staff calibration or access your company's list of staff calibration records (see section 5.1).
Calibration Range Parameters	Repository of information on all available staff calibration ranges (see section 4.3). Note: This menu is only accessible to verifying authority users.
Leveling Staff Registry	Repository of your company's staff calibration certificates (see section 5.3).

5.1. Staff Calibration

The *Staff Calibration* menu allows to perform a new barcoded staff calibration and lists records of all successful calibrations together with the calibration reports (see Figure 5.2).



Figure 5.2: List of staff calibrations.

To perform a new staff calibration, use the Start new calibration button to open the Barcode Staff Calibration Details interface shown in Figure 5.3 and enter the following information:

Calibration Site From the drop-down menu select the staff calibration range. **Job Number** Enter a job number to uniquely identify the calibration.

Staff Number From the drop-down menu select the used staff by its number. If the staff is not available, use the ▶ button to add it to your company's barcoded staff register (see instrument register in section 4.1).

Level Number From the drop-down menu select the used digital level instrument by its instrument number. If the digital level is not available, use the

by its instrument number. If the digital level is not available, use the button to add it to your company's digital register (see instrument

register in section 4.1).

Start and End Temperatures

Enter the start and end temperatures present during the field

observations.

Field Data Attach the ASCII file generated by the digital level instrument

containing all observations.

Field Book Attach the field book(s) created during the fieldwork.

Observer Either confirm if you are the observer or enter the observer's name.

Calibration data Enter the date when observations were taken.

Perform the calibration using the submit button.

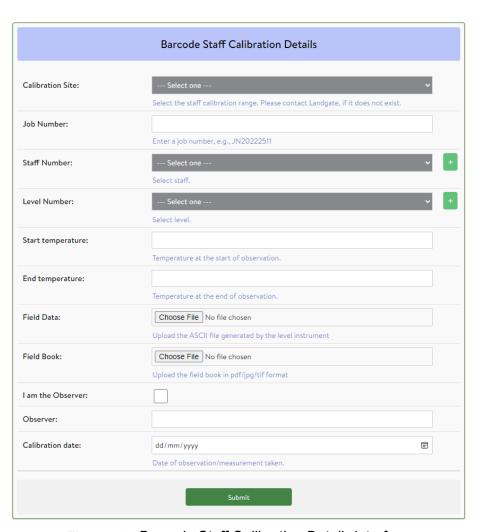


Figure 5.3: Barcode Staff Calibration Details interface

Use the submit button to perform the calibration. After successful completion you will be presented with the calibration report. The report is also added to your company's list of

staff calibrations (see Figure 5.2). Use the action buttons of to edit or delete a record. If you edit a calibration record you will be able to change the input information and perform the calibration again. Note, the previous calibration report will be retained in the list while the new report will be added.

For detailed information on field procedures, mathematical models used and report outputs refer to the user guides and technical manuals available under the resources option on the home page or following information button ①.

5.2. Leveling Staff Registry

The Leveling Staff Registry provides all current (most recent) and historical barcoded staff calibration records including their certificates (calibration reports) (see Figure 5.4).

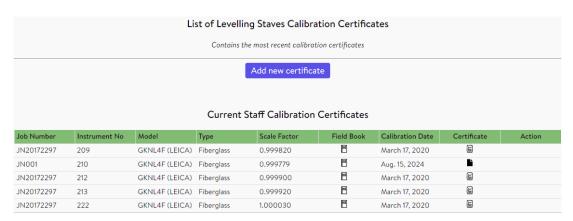


Figure 5.4: List of Current Staff Calibration Certificates.

Use the Add new certificate button to open the input interface to create a new barcoded staff certificate record.

5.3. Staff Calibration Procedures

Step 1: To start a new Staff Calibration, click on the **Staff Calibration** > **Staff Calibration**.

Step 2: Click on the **Start new calibration** button.

- **Job Number**: enter a **Job Number** with a ten-digit alphanumeric code.
- Calibration Site: select Boya from the dropdown.
- Staff Number: select the staff number or enter a new one by clicking on the + button.
 When entering (or creating) a new staff, a new window will pop up and users are
 advised to enter all the known fields Make, Model, Owner, Staff Number, Type, Length
 and CoE. If the staff has been previously calibrated, users can tick the Is
 Calibrated box. A new window will appear to provide information about the calibration
 details
- Level Number: select the digital level (number) or enter a new one by clicking on the + button.
- Start temperature: Temperature at the beginning of measurement.
- **End temperature**: Temperature at the end of measurement.
- Field Data: Click the Choose File button to select the csy file.
- Field Book: Click the Choose File button to select the field book (in pdf format).
- Enter an **Observer** name or tick the **I am the Observer**, if the observer is same as the person performing this procedure.

- Calibration date: Choose a calibration date.
- Click the **Submit** button.
- Note:
 - Form errors will be shown in red text to help correctly fill the form.
 - Test data is provided <u>here</u> with the corresponding <u>Field Book</u> to assist with the Staff Calibration procedure.

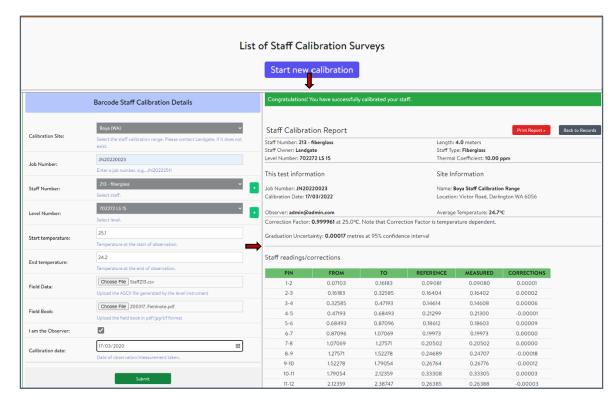


Figure 5.5: Staff Calibration Procedure.

Step 3: By submitting the form in **Step 2**, the files will be read and processed to calibrate the staff. The Staff Calibration Report will be displayed in the next window - tabulating the Correction Factor (a multiplicative scale factor) and the graduation uncertainty at 95% confidence level at 25°C, staff readings and corrections, the correction factors/errors at various temperatures. If the temperature exceeds +55°C or -10°C at Correction Factor = 1, users are advised to check for possible errors in metadata information provided. Wooden staves generally exceed this limit and are generally used for high precision levelling.

Step 4: Click on the **Print Report >>** to print in a pdf format. The report has three pages. A formula is provided in Page 1 just below the **Correction Factor** on how to apply it to the future height differences (see below).

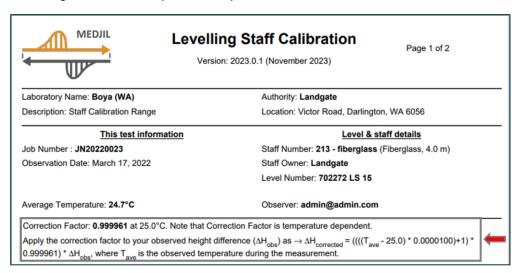


Figure 5.6: Staff Calibration Certificate.

Step 5: Staff Calibration Record – The staff calibration records are automatically stored in a database. Calibration reports can be retrieved from the **Levelling Staff Registry** under the **Staff Calibration** tab.

Users are also able to **add** previous calibration record (s) here by clicking the **Add new** calibration certificate. However, the form only accepts staffs calibrated at Boya Staff Calibration Range and it is also important to note that previous calibration has no impact on the current calibration as they are independent of each other.

6. EDM Calibration



Figure 6.1: EDM Calibration drop-down menu

The *EDM Calibration* area is used to perform and manage calibrations of EDM Instrumentation (EDMI; EDM and Prism), refine uncertainty budgets and create customized calibration report endnotes. Use the *Staff Calibration* drop-down menu (see Figure 6.1) to access the following areas:

EDMI Calibration	Start a new EDMI calibration or access your company's list of EDMI calibration records (see section 6.1).
Interlaboratory Comparisons	Compare EDMI Calibration results (see section 6.2).
Uncertainty Budgets	Definition of a customised (e.g. instrument- or company-specific) uncertainty budget (see section 6.3).
Report Endnotes	Create a customised (e.g. company-specific) endnote to be included in calibration reports.

6.1. EDMI Calibration

The *EDMI Calibration* menu allows to perform a new EDMI calibration and lists records of all EDMI calibrations to either edit or delete. Successful EDMI calibrations will display as icon link to the html calibration report (see Figure 6.2).



Figure 6.2: List of EDMI calibrations.

To perform a new EDMI calibration, use the Start new calibration button to open the EDMI Calibration Details interfaces shown in Figures 6.3 to 6.5 (input is done in three steps) and enter the following information:

Step 1 of 3:

Calibration Site From the drop-down menu select the EDMI calibration site. Tick the

"Auto select corresponding calibration of this baseline" box to automatically detect the calibration date of the baseline, e.g. commensurate with the observation date. Alternatively select the

calibrated baseline.

Survey Date Specify the date field observations were taken.

Observer Specify the observer.

Weather From the drop-down menu select the weather conditions during the

field observations.

Job Number Optional, Enter a job or reference number to uniquely identify the

calibration.

Comment Optional, Enter any comment.

Click next to enter details in step 2.

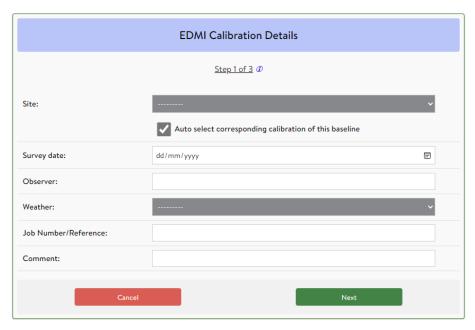


Figure 6.3: EDMI Calibration Detail interface (Step 1 of 3).

Step 2 of 3:

EDM From the drop-down menu select the EDM instrument used. If the

EDM instrument is not available, use the • button to add it to your company's Total Station EDM register (see instrument register in

section 4.1).

Prism From the drop-down menu select the prism used. If the prism is not

available, use the 🖸 button to add it to your company's Prism

register (see instrument register in section 4.1).

Atmospheric corrections

Tick if atmospheric corrections have been applied to the EDM observations prior to import. Unticking this box will make Medjil apply the first velocity correction to the imported data.

Thermometer, Barometer and Hygrometer From the drop-down menus select the thermometer, barometer and hygrometer used. If the instruments are not available, use the button to add them to your company's instrument register (see section 4.1). (Hygrometer is Optional)

Meteorological corrections

Tick the respective boxes if thermometer, barometer or hygrometer calibration corrections are applied. Unticking these boxes will result in calibration corrections being applied to the imported records. The calibration is selected according to the survey date and the register of calibration certificates for specified instruments

Next

Click next to enter details in step 3 or click back to return to step 1.

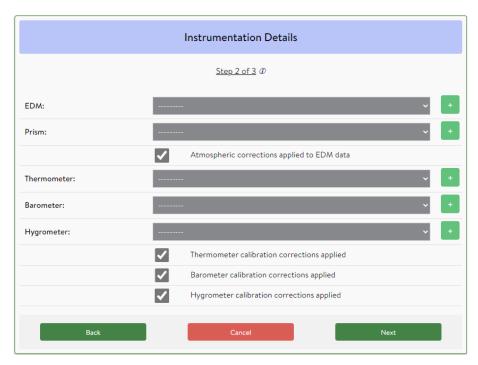


Figure 6.4: EDMI Calibration Detail interface (Step 2 of 3).

Step 3 of 3:

Uncertainty budget From the drop-down menu select either the default uncertainty

budget or a customised uncertainty. Use the 🚹 button to add a

customised uncertainty budget (see section 6.3).

A-priori scalar Specify the a-priori scalar (factor) or use the default of 1.0. Entering

a value other than 1.0 will result in all a-priori uncertainties being

multiplied by this factor.

Rejection criteria Specify the rejection criteria for outlier detection or use the default

of 2.0. Outliers based on this criterion will be flagged in the

calibration report.

Cyclic errorsTick if cyclic errors should be determined and tested for significance

during the calibration processing. Cyclic errors cannot be

determined for instruments with no specified unit length.

Scanned fieldnotes Attach any fieldnotes.

EDM File (*.csv) Attach the total station generated observation file (*.csv).

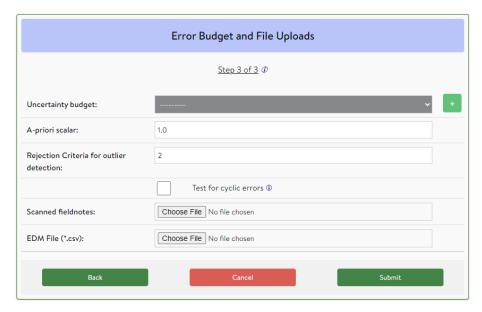


Figure 6.5: EDMI Calibration Detail interface (Step 3 of 3).

Use the submit button to start the EDMI calibration. After the EDM observations have been successfully imported you will be presented with a list of all observations (see Figure 6.6). From the list select/deselect the observations to be used to estimate the EDM instrument corrections. See information button if for more information. Then use the button at the bottom of the observation list to perform the calibration. Alternatively use the button to change any of the input information (see steps 1 to 3) or cancel the calibration by using the

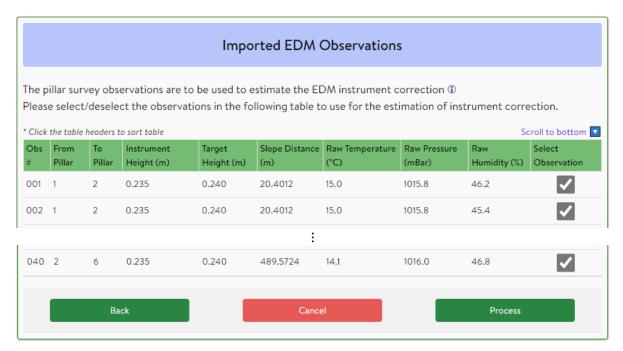


Figure 6.6: List of imported EDM observations (extract).

After a successful calibration you will be presented with the calibration report. At the bottom of the report enter the approval details. Once saved the report will be added to your company's list of EDMI calibrations (see Figure 6.2). To view the report, use the icon link . Use the action buttons and to edit or delete a record. If you edit a calibration record you will be able to change the input information and perform the calibration again. Note, the previous calibration report will be retained in the list while the report is being recalculated.

For detailed information on field procedures, mathematical models used and report outputs refer to the user guides and technical manuals available under the resources option on the home page or following information button ①.

6.2. Interlaboratory Comparisons

As a requirement in accordance with ISO 17025:2017, the *Interlaboratory Comparisons* menu allows to perform comparisons between calibrated baselines (reference laboratory) to confirm they deliver the same results. For more information follow the information button ①.

6.3. Uncertainty Budgets

Through the *Uncertainty Budgets* menu, you will be able to create and edit a customised (e.g. company specific) uncertainty budgets (see Figure 6.8) to be used for a calibration instead of Medjil's default values.



To create a new uncertainty budget, use the Custom Uncertainty Budget interface shown in Figures 6.8.

The uncertainty budget comprises of the following sources:

- a.) **Instrument-related uncertainties** that are specified through the *Instrument Register* (see section 4.1) and will be sourced during computations.
- b.) Derived uncertainties that are computed during the calibration based on observations.
- c.) **Custom uncertainties** a user can define to be used for the calibration.

Use the drop-down menu to select one of the following custom uncertainty sources (see Figure 6.8).

- EDM scale factor
- EDMI measurement
- EDM LS zero offset
- Temperature
- Pressure
- Humidity
- Certified distances
- EDMI calibration
- Centring (instrument and prism)
- Heights (instrument and prism)
- Offsets

Use the + Add new uncertainty link to add a new uncertainty source or in to delete an existing uncertainty source.

For each uncertainty source specify the unit, uncertainty type, statistical distribution type, uncertainty value, coverage factor K and degree of freedom. For more detailed information refer to the technical manual available under the resources option on the home page or follow the information button ① on the *Create Custom Uncertainty Budget* interface (see Figure 6.8).

Apart from the custom uncertainties listed above you can also specify the numerical value used when a standard deviation is statistically zero (default value is 0.0002).

Once completed, use the button to save your customized uncertainty budget which will be added to list of uncertainty budgets (see Figure 6.7). Use the action buttons and to edit or delete a record.

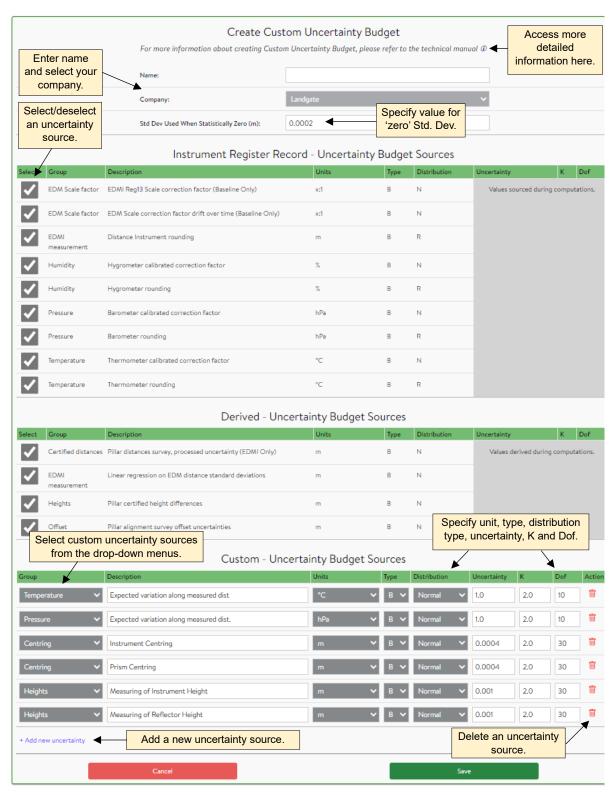


Figure 6.8: Custom Uncertainty Budget interface.

6.4. Report Endnotes

The Report Endnotes menu allows to create or edit customised endnotes and lists records of your company's existing endnotes (see Figure 6.9). These company specific endnotes will be included in addition to those created by the verifying authority in both EDMI and Baseline calibration reports.

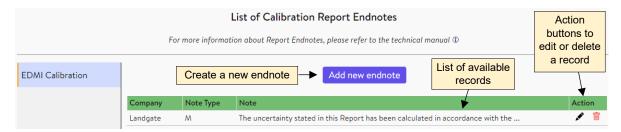


Figure 6.9: List of Calibration Report Endnotes.

To create a new customised endnote, use the Add new endnote button to open the Create Report Endnote interface shown in Figure 6.10. Leaving the 'Site' field blank will apply the endnote to all company reports. Selecting a specific 'Site' from the options will only apply the endnote to Company reports associated with that site.



Figure 6.10: Create Report Endnote interface.

Once created, use the button to save your customized endnote which will be added to the list of calibration report endnotes (see Figure 6.9).

7. Resources



Figure 7.1: Resources drop-down menu

The *Resources* area provides access to all calibration instructions and technical manuals. Use the *Resources* drop-down menu (see Figure 7.1) to access the following information:

Calibration Instructions	Access to Staff and EDMI calibration user guides.
Site Calibration	Provides information on the procedure used for the calibration of either a staff range or a EDM Instrumentation baseline.
Instrument Calibration	Provides information on observation and field procedures used to calibrate either a barcoded staff or EDMI calibration.
Technical Manuals	Access to Staff and EDMI technical manuals.
Staff Calibration	Provides information on the Boya (WA) staff calibration range, mathematical models used for staff calibration including the computation of a correction factor for barcoded staff.
EDMI Calibration	Provides general information on baseline design, mathematical models used for baseline and EDMI calibrations, corrections, modelling of uncertainties, EDMI correction, least squares adjustment and statistical tests.

Issues:

Landgate welcomes any positive feedback the user experience. Please log issues to geodesy@landgate.wa.gov.au.