Ballistic Calculator

Phase 2

August 21, 2019

Version 8.0

Version	Date	Editor	Functional Changes
1.0	2/22/2019	Aimee Carson	Initial Draft
2.0	2/27/2019	Aimee Carson	Revised with Development Feedback
3.0	3/8/19	Aimee Carson	Revised with Client Meeting Notes
4.0	3/18/19	Aimee Carson	Revised with BC Data
			Revised Sight-In Distance
5.0	4/29/19	Aimee Carson	Incorporated Feedback from Germany
6.0	5/9/19	Aimee Carson	Further Clarified notes for Ahmed/Jim and removed specific functions
7.0	5/19/19	Aimee Carson	Added v1/v2 function and additional bullet drop option to scope
8.0	8/21/19	Aimee Carson	Revised to specify itemizations requested by client

Objective:
Optimize the current web application for international users and improve upon usability and calculations. Third party data will be integrated and additional Operating Systems will be supported. The Web application will act as the master and the mobile applications will need to be updated simultaneously.

(Itemization: Consider mobile application updates to match the web app as an itemized line item in cost estimate.)

Timeline:
To be redetermined

1. **Design Elements**

All design elements to match up to currently approved mobile applications. Design Files to be provided by RedBarn

2. **Technical Specifications**

System Requirements will reflect support for the following Operating Systems:
Windows XP
Windows 7
Windows 8
Mac OS 10.7.5 or higher

Including the following browsers:
Internet Explorer 8/9/10
Firefox 18 and higher
Chrome 22 and higher
Opera 12 and higher
Safari 6 and higher

3. **Language Localization**

- German
- English

Developer to provide list of resource files that need translation for user interface. Client to provide resource to translate all text, files, hover tips, help files and manuals on user interface.

Total Hours: 30
Itemization Total Hours including Russian: 30

4. **Geolocalization**

The application should detect the country of user location based on IP address in order to determine the following:

1. Localized languages - German or English to display by default based on IP by country. If user IP is from any of the following countries, the language should

default to German. All other countries should default to English, no mapping from client required:

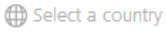
i. Germany
ii. Austria
iii. Switzerland
iv. Luxemburg

2. Measurement unit - Metric or Imperial measurements to display by default, based on IP. Client will provide a mapping of countries and measurement required for each.
3. Scopes by Market - Scopes to display to users in dynamic Scope selection dropdown (specific scopes are not available in several countries). This should be tied directly to the measurement toggle function. If user selects a metric measurement, only metric scopes for those markets that have metric measurements would be available to view. Client will have to provide market mapping.

5. Language / Measurement Toggle

In addition to Geolocalization, two toggle switches will be available from the calculator view:

1. Language Selector - to be placed in top right corner to match design element of current site



2. Measurement Selector - to be located and designed near top left of calculator screen. Red Barn to provide design file.

Language and Measurement will default based on IP address however all users should have the ability to update this setting if required.

6. **Measurements Mapping**
   Developer to provide list of fields that need measurement conversion. Client to provide and confirm all necessary metric measurement units for each field to be addressed, including the following:

   Temperature: Celsius
   Inches to Centimeters
   Altitude: Meters
   Sight Height Above Bore: Centimeters
   BC: Kg per square meter
   Muzzle Velocity: Meters per second
   Sight in Distance: ~~Kilometer~~ Meters
   Impact: Meters
   High: Centimeters

7. **User Manuals**
   Current calculator and data capture page to display the following manuals from dropdown selector. A total of 4 manuals to be displayed:
   1. General User Manual – to be archived
   2. APID-Z 1000 Sight-in Instruction
   3. APID-Z User Manual USA version (formerly Conquest HD-5ZF with extracted APID-Z data (pgs. 5 - 16))
   4. APID-Z User Manual (European Version) - sports O to provide PDF
   5. RZ User Manual (formerly sports O GBH TerraZ3 with extracted APID-Z data (pgs. 7 - 15))

   Client to review current manuals and provide updates with metric and language references for the above listed manuals.

8. **Contact Us**
~~Instead of using an email hyperlink, a Contact Us page will be created to display all appropriate contact addresses, phone numbers and email and support links. Client to provide content in both languages.~~

Client to provide hyperlink to 3 different, already existing Contact Us pages. Dropdown should be configured for user to select from USA, Europe and other (TBD).

9. **Email Share Option**
The user requires an option to share a reticle magnification PDF with an email address. We should provide a function next to the Save / Print option that is visible after the reticle image is rendered so that the user can share the PDF with an external email address.

10. **Data Capture Report**
Currently the system is capturing the email address and postal code for all users for marketing purposes. The client requires an administration module to allow them to pull reports, filter and distribute reports for the captured user data:

1. ~~Capture data will need to include a version data stamp of the application accessed so that the client can better send promotional items to specific version audiences.~~
2. Country will need to be captured in the back-end report as a separate field. This data could be pulled from the same function that is built for the Geolocalization feature. The system should detect and populate this information automatically from the IP settings of the user. The data will only be captured on the back-end and will not be viewable in the interface.

The current configuration will stay the same as in, the data will be required only once from the user. If their IP address changes or they clear their browser cache, the user will be prompted again for the information and it will be logged again.

11. **Data Capture User Interface**
The data capture page will be updated so that the liability claim and user manual are only accessed from the calculator page.

12. **Bullet Dropdown**
Each bullet listing in the database currently has an [in=inches], [gr=grains] and [type] for each line item in the database. Client requires that we add a fourth point of data to each bullet so that the user can see the specific [gramm] for each bullet. Ie. User currently sees .224in (inches) | 36gr (grains) | FG FB (type). The new data will render as .224in (inches) | 36gr (grains) | 2.33grm (gramms) | FG FB (type). We should already have access to this data somewhere in the database provided originally.

Data for gramm was not found in current database so third party contact will need to provide the updated data points and additional cost may be incurred for acquiring this data. We need to ensure that abbreviations are not used as the abbreviations are similar and conflicting between US and European markets for gramm and grain.

13. **Yardage Output**
    User needs to see all yardage output instead of N/A results. Math calculations should display actual number results instead of (N/A) data. N/A data is usually a result of yardage output that becomes so far removed from the intended yardage bar that it defaults to (N/A). For 5% of the cases, development can address this issue by increasing the maximum range in the calculations. For the remaining 95% of the cases, the N/A result cannot be removed or solved but we could rename the N/A result to a more user friendly and understandable option, if needed.

    a. Upon analysis, it has been recommended and agreed to use the "Exact BC Approach" rather than using the "Muzzle Velocity BC" approach for more accurate results in data. **https://www.dropbox.com/s/yu3l96w9vwak7g6/APID-Z_AlgorithmDescriptionDocument_v1.4.docx**
    b. RedBarn to add a dynamic text, tooltip or non-hover notification that will appear with any N/A data to instruct user that "Some calculated data is out of limit and cannot be displayed with your specified parameters."

(Itemization: Consider yardage updates as itemized line item in cost estimate. Possible Phase 3 depending on total estimate.)

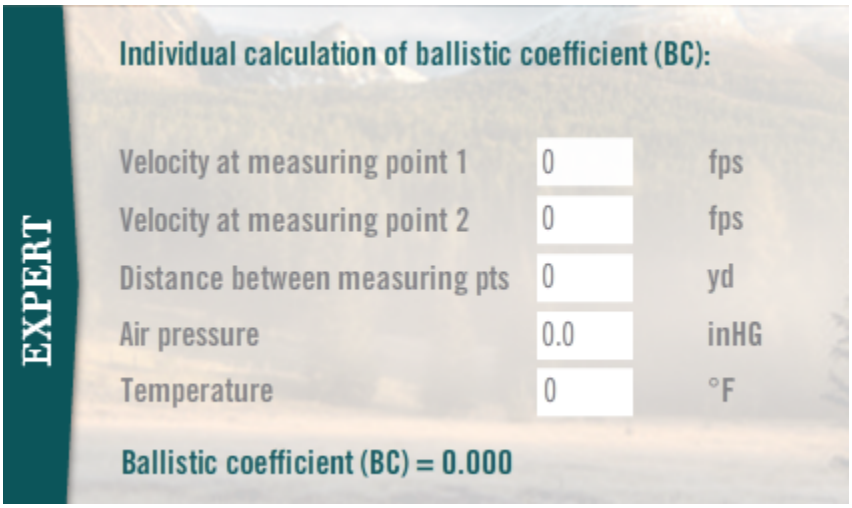
14. **Advanced Settings**
    a. ~~Formatting of the BC field should accommodate decimals to the thousandth place (ie. 0.396). Currently the font is too large for the entire decimal to fit efficiently.~~ This requirement is already live as of the Phase 1.5 release.

    b. The Advanced Settings link should be moved to the 4th step, in the Manual Settings section, directly to the right of the 'Select Manual Settings' title.

    c. ~~User requires option to enter Ballistic Coefficient (BC) in the Advanced Settings field~~ (already implemented in Phase 1.5). In the case that the bullet being used is not available on the bullet/caliber parameter selection, user requires the option to enter 'other' in the caliber dropdown. If user clicks 'Other' as bullet/caliber without entering the BC and then clicks 'submit data', the Advanced Settings window should appear for them to enter the mandatory BC field and a message "Please enter the specific BC that you are using"

    d. Velocity Measurement - U.S. (Imperial/Standard) based users will require the option to enter two muzzle velocities in the case that they are unsure of the Ballistic Coefficient (BC). You can review this Swarovski calculator as an example. Go to the 'E' panel (expert panel) and you'll see an option for 'Velocity at Measuring Point 1 and 2' available to the user as an advanced setting. Whether the user selects a predefined list of drag models to select from (60-80 hour estimate) or if there is a default drag model (G1) to use by default (<60 hour estimate) will be further determined.

(Itemization: Consider Velocity 1 or 2 function as itemized line item in cost estimate. Possible Phase 3 depending on total estimate.)



Expert Notes: This will take some algorithm development to implement as the solution is not obvious off-hand. Please see my last email from 2 May. This is something that few ballistic calculators perform and I've found only vague descriptions of how this is computed. The only question I had was whether this calculation was to be performed assuming a certain drag model (such as G1) or if the user can specify the drag model to use. In either case, the inputs to this algorithm will be the data shown on the GUI provided in the requirements document as well as a drag model (defaulted or specified) and the output will be a ballistic coefficient value.

May 2nd email: In any case, my only question = is whether the calculation should assume a specific drag model (G1, G7, = etc.) or if it should allow the user to selection the drag model that = should be assumed for this calculation?

In addition, the algorithm to calculate item 4 under the = advanced settings section is non-trivial. It is certainly doable, but = because of its complexity, it is rarely offered in existing ballistics = calculators. I just wanted to point this out because it may take upwards = of 60-80 hours to develop and test such an algorithm adaquately. This is = especially true if it needs to be computed for any specified drag model = as opposed to a single assumed drag model.

15. **Third Party Data**
    Admin function should be provided to allow the client the ability to update third party data for both mobile and web applications without assistance from RedBarn. Function should include an automatic update to the mobile applications and web application upon new data upload. Data will be inserted as new and client will be required to use versioning software to track archived data.

    Quarterly Updates will continue as a separate entity and invoice until this function is implemented in Phase 2.

    Updates for 2019 as follows:
    Q1: May 1, 2019
    Q2: June 30, 2103
    Q3: September 30, 2019
    Q4: December 31, 2019

    (Itemization: Consider Admin Panel as itemized line item in cost estimate vs. RedBarn quarterly data updates. sports O may consider the Admin Panel as possible Phase 3 depending on total estimate. They might rather pay quarterly maintenance costs to RedBarn to update data directly through our development team)

16. ~~**Magnification Increments**~~
    ~~Actual measurements on the slider will stay at the original (0.5) half-increment. Optimum measurements need to be exact (.1) increments (ie 19.2 or 19.7) in direct correlation to the database reticle calculation. This may cause a decrease in performance and speed as the calculations will be 5x the original.~~

17. **Bullet Drop Toggle**
    Currently the user can view all reticle images with yard measurements specified close to the hashmarks on each reticle image. User requires the ability to toggle between either yard measurements or bullet drop on this function.

    (Itemization: Consider Bullet Drop Toggle as itemized line item in cost estimate. Possible Phase 3 depending on total estimate.)

18. **Additional Estimate for Maintenance Agreement**

    sports O requires an Annual maintenance agreement to include quarterly data updates and other possible maintenance issues.

    (Itemization: Consider Annual agreement with quarterly payments for monthly maintenance and quarterly updates, as itemized line item in cost estimate. Possible Phase 3 depending on total estimate.)