GMB. When attached, the range extension unit adds aerodynamic lift to the GMB to extend/increase the range of the GMB in comparison to the GMB without the range extension unit being equipped. The range extension unit includes a set of wings that can be transitioned between a retracted state and a deployed state. When attached to the GMB, the range extension unit provides the entire structure with a center of gravity that is relatively closely positioned to an aerodynamic center of the wing.

[0005] In one aspect, there is disclosed a range extension unit for a guided mortar bomb, including: a housing interface defining an internal cup that receives a rear portion of a guided mortar bomb, the housing interface covering a rear portion of the mortar bomb in the area between a start of an aft-sloping part of the mortar bomb and a root of a propulsion charge stem attachment point at the rear of the mortar bomb, such that the housing interface, when coupled to the mortar bomb, collectively form an aerodynamically shaped body with the mortar bomb; and at least two deployable wings attached to the housing interface, wherein the wings transition between a retracted state and a deployed state; a guidance unit positionable on a front-most end of the mortar bomb; and a stem attached to the housing interface at a location rearward of the at least two deployable wings, the stem extending rearwardly from the housing interface, the stem being an elongated, cylindrical structure, the stem being sized to fit within a muzzle of a firing device.

[0006] In another aspect, there is disclosed a method of extending a range of a mortar bomb, including: providing a mortar bomb; inserting a rear region of a mortar bomb into a housing interface of a range extension unit, the housing interface defining an internal cup that receives a rear portion of a guided mortar bomb, and such that the housing interface covers a rear portion of the mortar bomb in the area between a start of an aft-sloping part of the mortar bomb and a root of a propulsion charge stem attachment point at the rear of the mortar bomb, and such that the housing interface, when coupled to the mortar bomb, collectively forms an aerodynamically shaped body with the mortar bomb, wherein the range extension unit includes at least two deployable wings attached to the housing interface, and wherein the range extension unit includes a stem attached to the housing interface at a location rearward of the at least two deployable wings, the stem extending rearwardly from the housing interface, the stem being an elongated, cylindrical structure, the stem being sized to fit within a muzzle of a firing device.

[0007] The details of one or more variations of the subject matter described herein are set forth in the accompanying drawings and the description below. Other features and advantages of the subject matter described herein will be apparent from the description and drawings, and from the claims.

CLAIMS

1. A range extension unit for a guided mortar bomb, comprising:

a housing interface defining an internal cup that receives a rear portion of a guided mortar bomb, the housing interface covering a rear portion of the mortar bomb in the area between a start of an aft-sloping part of the mortar bomb and a root of a propulsion charge stem attachment point at the rear of the mortar bomb, such that the housing interface, when coupled to the mortar bomb, collectively forms an aerodynamically shaped body with the mortar bomb;

at least two deployable wings attached to the housing interface, wherein the wings transition between a retracted state and a deployed state;

a guidance unit positionable on a front-most end of the mortar bomb; and

a stem attached to the housing interface at a location rearward of the at least two deployable wings, the stem extending rearwardly from the housing interface, the stem being an elongated, cylindrical structure, the stem being sized to fit within a muzzle of a firing device.

2. The range extension unit of claim 1, wherein the housing interface includes a set of clevises that house the deployable wings and that attach the deployable wings to the housing interface.

3. The range extension unit of claim 1, wherein the deployable wings increase a range and stability of the mortar bomb when the range extension unit is attached to the mortar bomb.

4. The range extension unit of claim 1, further comprising a spring-action mechanism that automatically transition the wings to the deployed state upon first motion of the mortar bomb from a launch device.

5. The range extension unit of claim 1, wherein range extension unit and the guided mortar bomb have a center of gravity that is closer to an aerodynamic center of the guided mortar bomb than when the range extension unit is not mounted on the guided mortar bomb.

6. The range extension unit of claim 1, wherein the guidance unit comprises:

a housing, the housing having a bullet-nosed region and an attachment region, wherein the attachment region inserts into the mortar bomb, wherein the bullet-nosed region of the housing rotates relative to the attachment region of the housing;

a motor contained within the housing;

a bearing surrounding the motor such that the motor is contained entirely within the bearing, the bearing being rigidly attached to the housing such that the motor rotates with the housing and shields the motor from inertial loads experienced by the housing, wherein the bearing rotates about an axis perpendicular to a long axis of the mortar bomb.

7. A method of extending a range of a mortar bomb, comprising:

providing a mortar bomb;

inserting a rear region of a mortar bomb into a housing interface of a range extension unit, the housing interface defining an internal cup that receives a rear portion of a guided mortar bomb, and such that the housing interface covers a rear portion of the mortar bomb in the area between a start of an aft-sloping part of the mortar bomb and a root of a propulsion charge stem attachment point at the rear of the mortar bomb, and such that the housing interface, when coupled to the mortar bomb, collectively form an aerodynamically shaped body with the mortar bomb, wherein the range extension unit includes at least two deployable wings attached to the housing interface, and wherein the range extension unit includes a stem attached to the housing interface at a location rearward of the at least two deployable wings, the stem extending rearwardly from the housing interface, the stem being an elongated, cylindrical structure, the stem being sized to fit within a muzzle of a firing device.

8. The method of claim 7, wherein the wings are located on a location of the mortar bomb that would otherwise not have wings were the range extension unit not attached to the mortar bomb.