CLAIMS:

1. A fusion system for constructing fused tracks for a plurality of targets from radar detections, comprising:

a plurality of Ground Moving Target Indicator (GMTI) radars configured for detecting said plurality of targets in an area of interest, each GMTI radar configured and operable for

(i) scanning the area of interest within a corresponding scanning time frame, the scanning time frame of operation of each GMTI radar having a start scan time of scanning said area of interest and an end scan time of scanning said area of interest, and

(ii) providing GMTI plots in the form of plot vectors including at least location data of said plurality of targets in polar coordinates;

a plurality of conversion units arranged downstream of said plurality of GMTI radars, each conversion unit being in data communication with a corresponding GMTI radar, and configured to receive the GMTI plots from the corresponding GMTI radar and to convert coordinates of each GMTI plot from polar coordinates to Cartesian coordinates, thereby providing converted plots;

a plurality of GMTI trackers arranged downstream of said plurality of conversion units, each GMTI tracker being in data communication with a corresponding conversion unit, and configured to create preliminary GMTI tracks of said plurality of targets from the converted plots provided by said corresponding conversion unit;

a fused plots generator arranged downstream of the plurality of GMTI trackers in data communication therewith, said fused plots generator configured for constructing fused plots by using said converted plots and said preliminary GMTI tracks; and

a fused track generator configured to generate fused tracks for said plurality of targets from said fused plots.

2. The fusion system of claim 1, wherein said plurality of GMTI radars are arranged in a predetermined geometric arrangement in which lines of sight of said

plurality of GMTI radars are directed at angles of 180/*n* between each other, wherein n is the number of GMTI radars in said plurality of GMTI radars.

3. The fusion system of claim 1, wherein each GMTI radar of said plurality of GMTI radars provides all the GMTI plots associated with said plurality of targets at said end scan time.

4. The fusion system of claim 1, wherein said plot vectors are represented in the form of $(r(t), \theta(t), v_D(t))$, where $r(t)$ is the distance of a target from a corresponding GMTI radar at time *t* within said scanning time frame of said corresponding GMTI radar, $\theta(t)$ is the azimuth angle of the target at time *t* within said scanning time frame and $v_D(t)$ is the radial velocity of the target at the time *t* within said scanning time frame of said corresponding GMTI radar; and wherein said converted plots are represented by converted plot vectors $(x(t), y(t), v_D(t))$, where $x(t)$ is the projection of the location of the target on the x-axis at a time *t* and $y(t)$ is the projection of the location of the target on the y-axis at the time *t*.

5. The fusion system of claim 4, wherein said converted plots are associated with a 2x2 covariance matrix for noise $\begin{pmatrix} \sigma_x^2 & \sigma_x\sigma_y \\ \sigma_x\sigma_y & \sigma_y^2 \end{pmatrix}$.

6. The fusion system of claim 1, wherein said preliminary GMTI tracks are represented by a 4 dimensional state vector $(x_{tr}(t), y_{tr}(t), v_x(t), v_y(t))$, where $x_{tr}(t)$ and $y_{tr}(t)$ are coordinates of the target track on *x* and *y* axes correspondingly, and where $v_x(t)$ and $v_y(t)$ are the velocity vector projections on the *x* and *y* axes, correspondingly, and wherein said preliminary GMTI tracks are associated with a corresponding covariance matrix, which is a 4x4 matrix:

$$\begin{pmatrix} \sigma_x^2 & \sigma_x\sigma_y & \sigma_x\sigma_{v_x} & \sigma_x\sigma_{v_y} \\ \sigma_x\sigma_y & \sigma_y^2 & \sigma_y\sigma_{v_x} & \sigma_y\sigma_{v_y} \\ \sigma_x\sigma_{v_x} & \sigma_y\sigma_{v_x} & \sigma_{v_x}^2 & \sigma_{v_x}\sigma_{v_y} \\ \sigma_x\sigma_{v_y} & \sigma_y\sigma_{v_y} & \sigma_{v_x}\sigma_{v_y} & \sigma_{v_y}^2 \end{pmatrix}.$$

7. The fusion system of claim 1, wherein said plurality of GMTI radars operate in at least one of the following manner:

(i) sequentially one after another;

(ii) concurrently such that their scanning time frames at least partially overlap; and wherein at least one of said plurality of GMTI radars is last to end a scanning session.

8. The fusion system of claim 1, wherein the fused plots generator includes:

a prediction unit configured to generate predicted plots based on the converted plots and the preliminary GMTI tracks by assigning a common time tag to all the converted plots from said plurality of the GMTI radars, wherein said predicted plots are in the form of predicted plot vectors indicative of locations of said plurality of targets, said predicted plot vectors are in the form of $S = (x_p(t_p), y_p(t_p))$, where t_p is the common time tag corresponding to the end scan time of the radar which is the last to end a scanning session, and where $x_p(t_p)$ and $y_p(t_p)$ are predicted location projections of the target on the *x* and *y* axes, correspondingly, at time t_p; and wherein said predicted plot vectors are associated with a corresponding covariance error matrix $M_i = \begin{pmatrix} \sigma_{x_p}^2 & \sigma_{x_p}\sigma_{y_p} \\ \sigma_{x_p}\sigma_{y_p} & \sigma_{y_p}^2 \end{pmatrix}$, where *i= 1, 2,... n,* and *n* is the number of the GMTI radars in said plurality of radars; and

an assignment unit configured to assign the predicted plots from the plurality of GMTI radars to corresponding targets from said plurality of targets;

a fusion unit configured to construct fused plots for said plurality of the targets from corresponding predicted plots; said fused plots are represented by a fused plot vector $f = (x_f, y_f)$, where x_f and y_f are the fused location projections of the target on the *x* and *y* axes, correspondingly.

9. The fusion system of claim 8, wherein said predicted location projections of the target $x_p(t_p)$ and $y_p(t_p)$ are calculated by using the equations:

$$x_p(t_p) = x(t) + v_x(t) \cdot (t_p - t)$$
$$y_p(t_p) = y(t) + v_y(t) \cdot (t_p - t),$$

where x(t) and y(t) are location projections of the target on the x- and y-axes, respectively, at time t, and $v_x(t)$ and $v_y(t)$ are velocity vector projections of the target on the x- and y-axes, respectively, at time t.

10. The fusion system of claim 8, wherein each fused plot is calculated by:

$$f = F \cdot (M_1^{-1} \cdot S_1 + M_2^{-1} \cdot S_2 + \cdots + M_n^{-1} \cdot S_n),$$

where $S_1, S_2, \ldots, S_n$ are predicted plot vectors associated with the plurality of GMTI (R_1, R_2, …, and R_n) radars, and $M_1^{-1}, M_2^{-1}, \ldots, M_n^{-1}$ are the inverse covariance error matrices associated with the predicted plot vectors $S_1, S_2, \ldots, S_n$, correspondingly, and F is the fused covariance matrix, which is calculated by using the equation:

$$F = \frac{1}{M_1^{-1} + M_2^{-1} + \cdots + M_n^{-1}}.$$

11. The fusion system of claim 1, further comprising a memory utility coupled to said plurality of conversion units and said plurality of GMTI trackers, the memory utility including a database configured for receiving the converted plots and the preliminary GMTI tracks and storing the converted plots and the preliminary GMTI tracks in the database.

12. The fusion system of claim 1, further comprising a fused tracks presentation utility arranged downstream of the fused track generator, the fused tracks presentation utility being in data communication with the fused track generator, the fused tracks presentation utility configured for receiving the fused tracks from the fused track generator and for displaying the fused tracks to a user.

13. A method for constructing fused tracks for a plurality of targets from radar detections, comprising:

scanning an area of interest within a corresponding scanning time frame by a plurality of Ground Moving Target Indicator (GMTI) radars configured for detecting said plurality of targets in said area of interest, each corresponding scanning time frame having a start scan time of scanning said area of interest and an end scan time of scanning said area of interest;

providing GMTI plots by the plurality of GMTI radars in the form of plot vectors, said plot vectors including at least location data of said plurality of targets in polar coordinates;

converting coordinates of the converted plots from polar coordinates to Cartesian coordinates, thereby providing converted plots;

creating preliminary GMTI tracks of said plurality of targets from the GMTI plots;

constructing fused plots by using the converted plots and the preliminary GMTI tracks; and

generating fused tracks for said plurality of targets from said fused plots.

14. The method of claim 13, wherein said plot vectors are in the form of $(r(t), \theta(t), v_D(t))$, where $r(t)$ is the distance of a target from a corresponding GMTI radar at time *t* within said scanning time frame of said corresponding GMTI radar, $\theta(t)$ is the azimuth angle of the target at time *t* within said scanning time frame and $v_D(t)$ is the radial velocity of the target at the time *t* within said scanning time frame of said corresponding GMTI radar.

15. The method of claim 13, wherein said converted plots are presented by a converted plot vector $(x(t), y(t), v_D(t))$, where $x(t)$ is the projection of the location of the target on the x-axis at a time *t* and $y(t)$ is the projection of the location of the target on the y-axis at the time *t*, and $v_D(t))$ is the radial velocity of the target at time t within said scanning time frame, and wherein said converted plots are associated with a 2x2 covariance matrix for noise $\begin{pmatrix} \sigma_x^2 & \sigma_x\sigma_y \\ \sigma_x\sigma_y & \sigma_y^2 \end{pmatrix}$.

16. The method of claim 13, wherein operating of said plurality of GMTI radars is carried out in at least one of the following manner:

(i) sequentially one after another;

(ii) concurrently such that their scanning time frames at least partially overlap; and wherein at least one of said plurality of GMTI radars is a last to end a scanning session.

17. The method of claim 13, wherein the constructing of the fused plots comprises:

generating predicted plots based on the converted plots and the preliminary GMTI tracks by assigning a common time tag to all the converted plots from said plurality of the GMTI radars, where said predicted plots are in the form of predicted plot vectors indicative of locations of said plurality of targets; and

assigning the predicted plots associated with GMTI radars to corresponding targets from said plurality of targets; and

constructing the fused plots for said plurality of the targets from the corresponding predicted plots, wherein said fused plots are represented by a fused plot vector $f = (x_f, y_f)$, where x_f and y_f are the fused location projections of the target on the *x* and *y* axes, correspondingly.

18. The method of claim 17, wherein said predicted plot vectors are in the form of $S = (x_p(t_p), y_p(t_p))$, where t_p is the common time tag corresponding to the end scan time of the radar which is the last to end a scanning session, and where $x_p(t_p)$ and $y_p(t_p)$ are predicted location projections of the target on the *x* and *y* axis correspondingly at time t_p, wherein said predicted plot vectors are associated with a corresponding covariance error matrix $M_i = \begin{pmatrix} \sigma_{x_p}^2 & \sigma_{x_p}\sigma_{y_p} \\ \sigma_{x_p}\sigma_{y_p} & \sigma_{y_p}^2 \end{pmatrix}$, where *i= 1, 2,... n;* and *n* is the number of the GMTI radars in said plurality of radars.

19. The method of claim 18, wherein said predicted location projections of the target $x_p(t_p)$ and $y_p(t_p)$ are calculated by using the equations:

$$x_p(t_p) = x(t) + v_x(t) \cdot (t_p - t)$$

$$y_p(t_p) = y(t) + v_y(t) \cdot (t_p - t),$$

where x(t) and y(t) are location projections of the target on the x- and y-axes, respectively, at time t, and $v_x(t)$ and $v_y(t)$ are velocity vector projections of the target on the x- and y-axes, respectively, at time t.

20. The method of claim 19, wherein each fused plot is calculated by:

$$f = F \cdot (M_1^{-1} \cdot S_1 + M_2^{-1} \cdot S_2 + \cdots + M_n^{-1} \cdot S_n),$$

where $S_1, S_2, \ldots, S_n$ are predicted plot vectors associated with the plurality of GMTI radars and $M_1^{-1}, M_2^{-1}, \ldots, M_n^{-1}$ are the inverse covariance error matrices associated with the predicted plot vectors $S_1, S_2, \ldots, S_n$, correspondingly and *F* is the fused covariance matrix, which is calculated by using the equation:

$$F = \frac{1}{M_1^{-1} + M_2^{-1} + \cdots + M_n^{-1}}.$$