CLAIMS

1. A method for determining a spatial coverage of a multi-sensor detection system of sonar type comprising a plurality of sensors, said plurality of sensors being borne by carrying structures moving through a given geographic region, at least some of the carrying structures being mobile, the method comprising the steps of:

   - determining a set of parameters representing said geographic region and comprising environmental data, data relating to said carrying structures and data relating to said sensors;

   - iteratively computing the detection probabilities of said plurality of sensors in the geographic region on the basis of at least some of said parameters;

   - determining a three-dimensional representation of the spatial coverage of the detection system for the plurality of sensors;

   - determining 3D shadow zones of said geographic region, in which zones said detection probability is lower than at least one given threshold; and

   - selecting the shadow zones located in at least one predefined security zone of the system.

2. The method as claimed in claim 1, wherein said environment is a marine environment, and the method further comprises determining a sum of the selected shadow zones forming an access channel to security zones.

3. The method as claimed in claim 1, wherein said environment is a maritime environment, said environmental data comprising data that are variable in space and in time and that represent a profile of the seabed in a defined geographic region, a temperature profile of the volume of water, information defining the state of the sea, and information related to sea noise, said data of carrying structures moving through said marine domain defining one or more mobile platforms and/or one or more seabed objects.

4. The method as claimed in any one of claims 1 to 3, wherein said computation is carried out periodically according to a chosen period or continuously.

5. The method as claimed in any one of claims 1 to 4, wherein the spatial coverage of the detection system is represented according to a given viewing position and orientation, the step of determining a three-dimensional representation of the spatial coverage of the detection system comprising, for each sensor of said detection system, the steps of:

- receiving a dataset comprising a detection probability of said sensor in said geographic region, the detection probability being determined in a computation region associated with said sensor and included in said geographic region, the data of said set comprising computation-region position data and computation-region dimension data, and
- determining a 3D rendering of said detection probability of said sensor on the basis of at least some of the probability data, of the computation-region position data and of the dimension data.

6. The method as claimed in claim 5, further comprising a step of determining a main data structure having at least three dimensions on the basis of said probability data.

7. The method as claimed in either of claims 5 and 6, further comprising a step of determining a depth rendering of the volume encompassing the computation region on the basis of the computation-region position data, of the dimension data, and of the viewing position and orientation.

8. The method as claimed in claims 2 and 3, wherein said 3D rendering is volume rendering and in that the method further comprises a step of determining a volume rendering of the detection probability according to at least one function in a given color space on the basis of said main data structure and of said depth rendering.

9. The method as claimed in claim 8, wherein said step of determining a volume rendering comprises the steps of:

- determining a grayscale volume rendering of the detection probability on the basis of said 3D data structure and of said depth rendering; and

- determining a color volume rendering of the detection probability on the basis of the grayscale volume rendering.

10. The method as claimed in one of claims 1 to 9, wherein the step of determining a three-dimensional representation of the spatial coverage of the detection system comprises a step of generating the display of said three-dimensional representation of the spatial coverage, of shadow zones inside security zones and of access channels to the security zones on a screen or in augmented-reality mode or in virtual-reality mode.

11. A device for determining a spatial coverage of a multi-sensor detection system of sonar type comprising a plurality of sensors, said plurality of sensors being borne

by carrying structures moving through a given geographic region, at least some of the carrying structures being mobile, characterized in that the device is configured to:

- determine a set of parameters representing said geographic region and comprising environmental data, data relating to said carrying structures and data relating to said sensors;
- iteratively compute the detection probabilities of said plurality of sensors in the geographic region on the basis of at least some of said parameters;
- determine a three-dimensional representation of the spatial coverage of the detection system for the plurality of sensors;
- determine 3D shadow zones of said geographic region, in which zones said detection probability is lower than at least one given threshold; and
- select the shadow zones located in at least one predefined security zone of the system.

12. A computer program product for determining a spatial coverage of a multi-sensor detection system of sonar type comprising a plurality of sensors, said plurality of sensors being borne by carrying structures moving through a given geographic region, at least some of the carrying structures being mobile, wherein the computer program product comprises computer-program-code instructions that, when they are executed by one or more processors, cause the one or more processors to:

- determine a set of parameters representing said geographic region and comprising environmental data, data relating to said carrying structures and data relating to said sensors;
- iteratively compute the detection probabilities of said plurality of sensors in the geographic region on the basis of at least some of said parameters;
- determine a three-dimensional representation of the spatial coverage of the detection system for the plurality of sensors;
- determine 3D shadow zones of said geographic region, in which zones said detection probability is lower than at least one given threshold; and
- select the shadow zones located in at least one predefined security zone of the system.