WHAT IS CLAIMED IS:

1. An autonomous mobile apparatus that autonomously docks with a docking station, the apparatus comprising:

a main body including at least one connection unit configured to be connected to the docking station;

a drive unit configured to move the main body; and

a processor configured to control the drive unit,

wherein the processor is configured to control operation of the drive unit in a first mode for causing the main body to move in proximity to the docking station and a second mode for bringing the connection unit into contact with a docking unit of the docking station,

wherein the autonomous mobile apparatus further includes a plurality of connection units and a plurality of connectors that correspond to the corresponding connection units, respectively, is provided in the docking unit, and

wherein when at least a connection unit is not brought into contact with the corresponding connector, respectively, the processor is configured to determine that the contact is improperly made, to perform control to detect the at least one connection unit which is not in contact among the connection units, and to control the drive unit so that the at least one connection unit not in contact is brought into contact with the corresponding connector.

2. The autonomous mobile apparatus of claim 1, wherein the processor is configured to control the drive unit in the first mode to move the main body so that a distance between the main body and the docking station is equal to or smaller than a predetermined distance.

3. The autonomous mobile apparatus of claim 1 or 2, further including:

a distance measurement detector configured to measure the distance between the main body and the docking station,

wherein the processor switches from controlling the drive unit in the first mode to controlling the drive unit in the second control based on the distance measured by the distance measurement detector.

4. The autonomous mobile apparatus of any one of claims 1 to 3, wherein in the second mode, the processor is configured to perform compliance control of the drive unit such that, with a force exerted on the main body, the connection unit is brought into contact with the docking unit.

5. The autonomous mobile apparatus of any one of claims 1 to 4,

wherein the processor is configured to perform control to detect whether all the connection units are brought into contact with the connectors, respectively, and

wherein when all the connection units are brought into contact with the corresponding connectors, respectively, the processor is configured to determine that the contact is properly made.

6. The autonomous mobile apparatus of claim 5, wherein when the processor concludes that the contact is properly made, the processor is configured to control the drive unit so that the connection unit and the connector is physically fastened to each other.

7. The autonomous mobile apparatus of claim 1, wherein the processor is configured to control the drive unit for a predetermined time period or a predetermined number of times so that the connection units are brought into contact with the docking unit, and when the predetermined time period elapses or the predetermined number of time is exceeded, the processor is configured to control the drive unit so that the docking is interrupted.

8. The autonomous mobile apparatus of claim 6, wherein a coupling protrusion is formed in an outer surface of the main body so that the coupling protrusion of the main body is selectively coupled to a coupling groove of the docking station.

9. The autonomous mobile apparatus of any one of claims 1 to 8, wherein the processor is configured to measure a repulsive force that occurs due to physical coupling that results when the at least one connection unit is connected to a corresponding connector of the docking station and from the repulsive force, the processor is configured to determine whether the docking is successfully performed.

10. A method of controlling an autonomous mobile apparatus that docks with a docking station, the method comprising:

starting, by the autonomous mobile apparatus, docking;

executing a first mode for causing the autonomous mobile apparatus to move to a docking unit of the docking station;

executing a second mode for causing the autonomous mobile apparatus to bring a plurality of connection units into contact with a plurality of connectors, respectively, of the docking unit, when the autonomous mobile apparatus moves in proximity to the docking station so that the autonomous mobile apparatus comes within a predetermined distance; and

connecting the connection unit and the docking unit to each other when it is determined that the connection unit is brought into proper contact with the docking unit,

wherein in the executing of the second mode, when at least a connection unit is not brought into contact with the corresponding connectors, respectively, it is determined that the contact is improperly made, control is performed to detect the connection unit which is not in contact among the connection units, and the autonomous mobile apparatus is controlled so that the at least a connection unit not in contact is brought into contact with the corresponding connectors.

11. The method of claim 10, wherein in the executing of the second mode, compliance control of the autonomous mobile apparatus is performed so that with a force exerted on the autonomous mobile apparatus, the connection unit is brought into contact with the docking unit.

12. The method of claim 10 or 11, wherein in the executing of the second mode, it is determined whether all the connection units are brought into contact with the corresponding connectors, respectively, and when all the connection units are brought into contact with the corresponding connectors, respectively, it is determined that the contact is properly made.

13. The method of any one of claims 10 to 12, wherein when a distance measured by a distance detector between the autonomous mobile apparatus and the docking station

is equal to or smaller than a predetermined distance, a controller of the docking unit is configured to control a moving device of the docking unit so that the docking unit is brought into contact with the connection units of the autonomous mobile apparatus.