CLAIMS

1. A detector twistlock unit (109, 109') for standardized containers for detecting one or more hazardous conditions relating to toppling risk due to motion or to tampering in a stack of containers

comprising:

a body (301; 601) with an upper portion (303; 603) configured to be insertable and lockable into a lower corner fitting (108(2L)) of a standardized container (105(2)) and a lower portion (305) configured to be insertable and lockable into an upper corner fitting (108(1U)) of a standardized container (105(1));

one or more sensors (111, 327-339, 340, 342) configured to detect a parameter relating to the proximity to an external object and/or the position of the detector twistlock unit and/or the inclination of the detector twistlock unit and/or the noise in the vicinity of the detector twistlock unit;

a wireless transceiver (323) configured for wireless communication;

a processing unit (325) connected to said one or more sensors and to said transceiver, the processing unit being configured to:

store in memory and transmit a unique lock identifier which identifies said detector twistlock unit,

receive from said transceiver signals to activate and/or interrogate and/or deactivate said one or more sensors,

receive from said one or more sensors the status of the parameter detected by said one or more sensors, generate an output status signal of the detected status and output the output status signal to the transceiver;

a power supply (321) to power the wireless signal transceiver, the sensor(s) and the processing unit;

and wherein the transceiver is further configured to receive from the processing unit the detected status and to transmit a wireless status message related to the detected status.

2. A detector twistlock unit according to claim 1, characterised in that a sensor is an accelerometer (335) and/or a GPS position receiver, and/or an inclinometer each configured to generate a position-related status signal and output a wireless signal related to said status signal to said processing unit.

3. A detector twistlock unit according to any of the previous claims wherein the processing unit is further configured to:

compare the signal received from a sensor against a first threshold value, identify the occurrence of a potentially hazardous condition if the signal is outside said threshold value and transmit a warning message via said transceiver.

4. A detector twistlock unit according to any of the previous claims wherein the processing unit is further configured to:

compare the signal received from a sensor against a second threshold value, identify the occurrence of a hazardous condition if the signal is outside said second threshold and transmit an alarm message via said transceiver.

5. A detector twistlock unit according to any of the previous claims wherein the processing unit is configurable to wake up each said sensor for a first predetermined time interval and then deactivate each said sensor for a second predetermined time interval in order to minimise energy consumption.

6. A detector twistlock unit according to any of the previous claims wherein at least one sensor is integrated into said detector twistlock.

7. A detector twistlock unit according to any of the previous claims wherein at least one sensor is in a detector body (602) removably attached to said detector twistlock.

8. A detector twistlock unit according to any of the previous claims wherein at least one sensor comprises a photoelectric sensor and a light source.

9. A detector twistlock device according to any of the previous claims wherein it comprises an energy harvesting device (322) for replenishing the energy contained in the power supply.

10. A detector twistlock unit according to claim 9 characterised in that the energy harvesting device is a thermoelectric energy harvesting device or a photovoltaic energy harvesting device or a piezoelectric energy harvesting device or a pyroelectric energy harvesting device or a rf or wireless or

electromagnetic energy harvesting device or a wind energy harvesting device or a vibration energy harvesting device.

11. A detector twistlock device according to any of the previous claims characterised in that it comprises a visual alarm/warning system comprising, for example, one or more lights (351) and/or an audible alarm/warning system comprising a sound emitting device such as an alarm siren (353) or bell or buzzer or loudspeaker or the like.

12. System for detecting a hazardous condition in a container park of containers comprising at least two containers (105(1), 105(2)) and at least two detector twistlock units (109, 109') according to any of claim 1-11 characterised in that it comprises:

a security control unit (113) comprising at least one wireless security control unit transceiver for communicating with said detector twistlock units and software for:

receiving a warning message or alarm message from said detector twistlock units,

identifying the detector twistlock unit transmitting said warning or alarm message,

determining the position of said detector twistlock unit in said container park,

sending a wake-up signal to one or more other detector twistlock units in said container park to activate their sensors,

requesting a status message from awake detector twistlock units in said container park,

receiving status messages from awake detector twistlock units in said container park, and

determining that a hazardous situation is imminent or present if one or more additional warning message or alarm message is received from one or more awake detector twistlock units.

13. System according to claim 12 wherein said software further comprises means for:

transmitting a warning or alarm message when an alarm message is received from two or more detector twistlock units.

14. System according to claim 13 wherein said system comprises a drone with a camera and/or a robot with a camera and/or a fixed camera and said software is able to operate one or more of said

cameras to view a detector twistlock unit which has transmitted a warning message or alarm message.

15. System according to claim 13 or 14 wherein said system comprises access to a database containing the risk profile of each container and is adapted to extract from said database a risk profile of each container associated with a detector twistlock unit alarm message, and is further adapted to produce a danger intensity message based on said risk profile and transmit said danger intensity message.