CLAIMS

1. A method for event detection and reconstruction of image raw data in a reflective wave device, the method comprising:
- acquisition of image raw data of a sensor,
- derivation of a compressed representation of the image raw data with compressive sensing,
- frame-by-frame processing of the compressed representation,
- during the frame-by-frame processing of the compressed representation, the frame-by-frame processing comprises a frame-by-frame image reconstruction and simultaneously performing a detection of events based on a current frame of the compressed representation,
wherein, if an event is detected in the current frame, the image reconstruction comprises:
- retrieving a pre—determined number of frames, the pre-determined number of frames preceding the current frame,
- reconstructing an event based on a detection/ reconstruction subset, wherein the detection subset is derived from the current frame and the pre-determined number of retrieved frames.

2. Method according to claim 1, comprising:
- storing the detection/reconstruction subset in a buffer "B1”, the size of the buffer being larger than the amount required to store the detection/reconstruction subset by a buffering size, wherein the buffering size depends on the time required to transmit the detection/reconstruction subset to a processing unit.

3. Method according to claim 2, comprising:
if an event is detected:

- copying the detection/ reconstruction to a second buffer “B2”,
- sending the content of the second buffer "B2" to a scene reconstruction unit.

4. Method according to one of the preceding claims comprising:
if an event is detected, generating a data message, the data message comprising event data of the detected event.

5. Method according to one of the preceding claims comprising, if an event is detected, reconstructing an event scene.

6. Method according to one of the preceding claims comprising:
if an event is detected, reconstructing an image in which the event scene is marked.

7. The method of one of the preceding claims, comprising
- detecting whether an event is present in the current frame using a part P of selected coefficients or measurement subset for the current frame.

8. The method according to one of the preceding claims, wherein the compressive sensing comprises a random projection of the input set that is chosen such that the complete input set of data need not to be used.

9. A reflective wave device comprising:
- a sensor for acquisition of image raw data,

a computation unit with a processor, a memory and an output unit, the computation unit comprising a software program which provides the following method steps:
- deriving a compressed representation of the image raw data with compressive sensing,
- frame-by-frame processing of the compressed representation,
- during the frame-by-frame processing of the compressed representation, the frame-by-frame processing comprises a frame-by-frame image reconstruction and simultaneously performing a detection of events based on a current frame of the compressed representation,
wherein, if an event is detected in the current frame, the image reconstruction comprises:
- retrieving a pre—determined number of frames, the pre-determined number of frames preceding the current frame,
- reconstructing an event based on a detection subset, wherein the detection subset is derived from the current frame and the pre—determined number of retrieved frames,
- comparing the reconstructed event with a pre-determined threshold event,
- outputting a flag signal if the reconstructed event matches the threshold event.

10. A reflective wave device comprising:
- a sensor for acquisition of image raw data,
- a compressive sensing unit for deriving a compressed representation from the image raw data,
- a unit for a frame-by-frame image reconstruction and for simultaneously detecting an event based on a current frame, for reconstructing an event based on a detection subset, wherein the detection subset is derived from the current frame and a pre—determined number of retrieved frames, for comparing the reconstructed event with a pre—

determined event criterion and for outputting a flag signal if the reconstructed event matches the event criterion.

11. A reflective wave device according to claim 9 or claim 10, further comprising
- a buffering unit with a buffer "Bl", a size of the buffer "Bl" being larger than the amount required to store the detection subset by a buffering size, wherein the buffering size depends on a time required to transmit the detection subset to a processing unit.

12. A reflective wave device according to claim 11, the reflective wave device comprising a second buffer "B2”, a size of the second buffer being sufficient for storing the detection subset.

13. A mobile underwater sonar device with a reflective wave device according to one of the claims 9 to 12, the reflective wave device being provided at a body of the mobile underwater sonar device, wherein the sensor for acquiring the image raw data is provided by one or more acoustic sensors that are arranged laterally to a direction of travel of the mobile underwater sonar device.

14. A ship with a reflective wave device according to one of the claims 9 to 12, the reflective wave device being provided at a body of the ship, wherein the sensor for acquiring the image raw data is provided by one or more acoustic sensors that are arranged laterally to a direction of travel of the ship.

15 An unmanned aerial vehicle with a reflective wave device according to one of the claims 9 to 12, the reflective wave device being provided at a body of the unmanned aerial vehicle, wherein the sensor for acquiring the image raw data is provided by one or more radar sensors that are arranged laterally to a direction of travel of the unmanned aerial vehicle.

16. An aircraft with a reflective wave device according to one of the claims 9 to 12, the reflective wave device being provided at a body of the aircraft, wherein the sensor for acquiring the image raw data is provided by one or more radar sensors that are arranged laterally to a direction of travel of the aircraft.