

Sound Metrics Movement Detections

Sound Metrics provides a few types of non-rotating multibeam sonars, the ARIS Explorer 3000 and Didson sonars primarily. The ARIS Explorer operates at a frequency of 3 MHz with 128 beams, while the Didson sonar is similar, operating at a lower centre frequency. Both sonars cover 28 degrees horizontally and 14 degrees vertically. For more information, see the manufacturer's website: <http://www.soundmetrics.com>. The ARIS software *ARIScope* and Didson software can be requested through the Sound Metrics website <http://www.soundmetrics.com> (go to the support page) or [contact us](#). The main data product for these sonar are documented here: [Sound Metrics sonar data](#)

This data product is an annotation (.an) file containing a record of potential movement detections in the [Sound Metrics sonar data](#) as generated by the data product post-processor only. As such as, these files may not yet be generated and made available for all **ARIS** and **DDF** files; Data Search will return only the files that are in the archive (Unlike Sound Metrics sonar data files that may be generated on-the-fly from **ARIS** and **DDF** files). Movement detections by the post-processor also trigger an email to be sent out to subscribers with the same information as stored in this file. ([Contact us](#) if you would like your email address to be added post-processor's recipient list, internal documentation link: [Sound Metrics Sonar MATLAB Post Process Job](#)). The algorithm is simple and described in the email (see below). The parameters have been tuned for the initial data and maybe updated with new deployments, devices, etc. The parameters are device and time specific and are set by the device attributes system. The algorithm does generate false-positive detections in cases of poor quality images (such as a bad focus), although it is mitigated in normal operation.

Revision History

1. June 1st, 2017: Initial release
2. June 7th, 2022: support Didson sonars

Data Product Options

None at this time.

Formats

The Sound Metrics movement detection results file follows the standard annotation file format for Device Data annotations. Here is an example file:

[ARIS3000-1099_20170511T190005.976Z_20170511T191500.053Z-ARISmovementDetectionResults.an](#)

```
#ARIS Movement Detection Results, created by ARIS Sonar Matlab Postprocess Job, at 19-May-2017 17:57:51 UTC,
for file ARIS3000-1099_20170511T190005.976Z_20170511T191500.053Z.mp4. Results summary: 9 detection(s),
totalling 40.5 seconds.
#userid:1000
#resourcetype: Device Data
#overlap:Y
#"Name","Start Date","End Date","Quality Flag","Quality Comment","Comment"
23881,20170511T190029.553Z,20170511T190038.554Z,Movement detected in file ARIS3000-1099_20170511T190005.
976Z_20170511T191500.053Z.mp4: frame index 48; duration: 18 frames (9 seconds)
23881,20170511T190039.053Z,20170511T190046.553Z,Movement detected in file ARIS3000-1099_20170511T190005.
976Z_20170511T191500.053Z.mp4: frame index 67; duration: 15 frames (7.5 seconds)
23881,20170511T190050.553Z,20170511T190054.553Z,Movement detected in file ARIS3000-1099_20170511T190005.
976Z_20170511T191500.053Z.mp4: frame index 90; duration: 8 frames (4 seconds)
23881,20170511T190225.553Z,20170511T190228.053Z,Movement detected in file ARIS3000-1099_20170511T190005.
976Z_20170511T191500.053Z.mp4: frame index 280; duration: 5 frames (2.5 seconds)
23881,20170511T190229.053Z,20170511T190231.053Z,Movement detected in file ARIS3000-1099_20170511T190005.
976Z_20170511T191500.053Z.mp4: frame index 287; duration: 4 frames (2 seconds)
23881,20170511T190331.553Z,20170511T190335.553Z,Movement detected in file ARIS3000-1099_20170511T190005.
976Z_20170511T191500.053Z.mp4: frame index 412; duration: 8 frames (4 seconds)
23881,20170511T191049.053Z,20170511T191052.553Z,Movement detected in file ARIS3000-1099_20170511T190005.
976Z_20170511T191500.053Z.mp4: frame index 1285; duration: 7 frames (3.5 seconds)
23881,20170511T191054.053Z,20170511T191056.053Z,Movement detected in file ARIS3000-1099_20170511T190005.
976Z_20170511T191500.053Z.mp4: frame index 1295; duration: 4 frames (2 seconds)
23881,20170511T191150.053Z,20170511T191156.053Z,Movement detected in file ARIS3000-1099_20170511T190005.
976Z_20170511T191500.053Z.mp4: frame index 1407; duration: 12 frames (6 seconds)
```

The format of these files changed in the June 2022 update. The newer annotation files look like this:

```
#Sonar (ARIS/Didson) Movement Detection Results, created at 06-Jun-2022 20:16:36 UTC, for file
DIDSON3000SN374_20220502T201200.003Z.mp4. Results summary: 0 detection(s), totalling 0 seconds.
#userid:1000
#resourcetype: Device Data
#overlap:Y
#"ID", "Start Date", "End Date", "Comment"
26100,20220502T201201.000Z,20220502T201659.000Z,No movement detected in file DIDSON3000SN374_20220502T201200.
003Z.mp4.
```

The above is an example where no detections were made. Note that in the older files, the header line with the format doesn't correctly represent the content (there are only 4 comma separated columns)

A secondary output is an email, here's an example (from our test environment so the URLs won't work unless users are onsite at ONC):

```
Subject: Movement detected in sonar file ARIS3000-1099_20170705T230003.112Z.mp4: 1 detection(s), totalling
6.3333 seconds (DEV/QA)
```

Movement has been detected in ARIS3000-1099_20170705T230003.112Z.mp4.

Detections as follows:

Frame index 962, duration: 19 frames (6.3333 seconds)

Movement detection parameters as follows:

SonarMovementDetection_Threshold: 30 %

SonarMovementDetection_MinSizeAlongBeam: 3.6 cm

SonarMovementDetection_MinSizeAcrossBeam: 3 pixels/beams

SonarMovementDetection_MinTime: 2 s

The detection algorithm: subtract the median value of each pixel from itself to remove the background, then, in each frame, if the number of pixels above the threshold exceeds the number specified by the size thresholds (in total, not contiguous), which is 12, and 6 consecutive frames have this condition, then a detection is made and this alert is generated.

Download link for sonar video file:

https://qa.oceannetworks.ca/AdFile?filename=ARIS3000-1099_20170705T230003.112Z.mp4 (takes up to 15 minutes to become available).

To modify/delete/add this email subscription, go to

<https://qa.oceannetworks.ca/DeviceListing?DeviceId=23881> -> Additional Attributes tab and modify SonarMovementDetection_Recipients (this field is a comma-separated list)