Report on the BASTA Project Kick-off

January 14, 2020

Helmholtz Association, Berlin Office

Anna-Louisa-Karsch-Straße 2, 10178 Berlin

Authors:	Torsten Frey, Jens Greinert, Marc Seidel (GEOMAR); Tine Missiaen, Jose Felipe Barradas (VLIZ), Jann Wendt, Daniel Wehner (EGEOS); Aline Renson (G-tec)
Date of Publication:	February 3, 2020
Version:	1.0

1. About the Event

The BASTA project kick-off took place on January 14, 2020 at the Berlin Office of the Helmholtz Association in Berlin. The event featured numerous presentations on the project approach that were given by the project partners and presentations on project expectations that were held by associated partners. The event was accompanied by the 1st BASTA project meeting, which took place on January 13 and 15, 2020. It was therefore fully integrated in the consortium's discussions on the project execution.

Due to the overlap in terms of both project content and interest groups, the BASTA project kick-off was organized jointly with the ExPloTect consortium. Like BASTA, ExPloTect is led by GEOMAR and co-funded by the European Maritime and Fisheries Fund (EMFF) programme of the European Union (Grant Agreement No. 863693).

Targets of the Event

The project kick-off was directed at interested experts on offshore unexploded ordnance (UXO) surveys from the industry, authorities and the scientific community. With an event of this scale at such an early stage in the project the BASTA project partners sought to achieve the following targets:

- Inform experts about the project approach
- Receive early feedback on the project concepts and ideas, in order to be able to steer the project in a meaningful direction
- Strengthen the connection with existing associated partners and discussing their future involvement in the project
- Connect with other potential associated partners and interested parties in order to ensure high level achievement of project goals. This includes:
    - Establishing a stakeholder dialogue
    - Requesting the provision of survey data for the training of neural networks
    - Encouraging the use and testing of methods and technologies that will be developed over the course of the project
    - Driving the formalization of workflows and quality indicators

Agenda

The agenda of the event is shown in Table 1. It was developed to meet the targets laid out above. The day was divided into a morning and an afternoon session. During the morning session, both the BASTA and the ExPloTect project were presented to communicate overall project content, methodologies and aims. Furthermore, the project management board members of each BASTA project partner presented their institution's involvement in previous projects relating to the detection of offshore UXO, their expertise in the matter and most importantly their role in the BASTA consortium. Each presentation was followed by a brief discussion with the auditorium. The discussions of the morning session are summarized in chapter 2.

Table 1: Agenda of the BASTA project kick-off

Presenter	Affiliation	Title of presentation
Morning Session (Chaired by Jens Greinert – GEOMAR)		
Jens Greinert	GEOMAR	BASTA and ExPloTect Kick-off – Two new EU funded projects for advancing UXO detection methodologies
Jens Greinert	GEOMAR	Introduction to BASTA – Applying AI along the UXO survey workflow
Tine Missiaen	VLIZ	New Tools for Multisensor UXO Detection
Jann Wendt	EGEOS	A Multisensor Database with new Quality Metrics
Aline Renson	G-tec	Current Challenges during Offshore UXO Surveys
Aaron Beck	GEOMAR	**Ex**-situ, near-real-time ex**Plo**sive compound de**Tect**ion in seawater
Lunch Break and Networking		
Afternoon Session (Chaired by Torsten Frey – GEOMAR)		
Claus Böttcher	MELUND	Needs and expectations on BASTA
Dorthe Reng Erbs-Hansen Anja Drews	Vattenfall TenneT	BASTA kick-off
Peter Frost	NKT	Project Support: BASTA
Andrea Stolte	WWF	Das Geisternetze-Projekt des WWF (The Ghost Net project of the WWF)
Torsten Frey	GEOMAR	Final discussion

Between sessions, the participants enjoyed a lunch break and were given the opportunity to discuss the presented project approaches in an informal manner and to independently do networking. During the afternoon session, numerous associated partners presented their expectations and requests towards the project consortium. The content of the presentations served as input for the initiation of the stakeholder dialogue. After each presentation, the session chair encouraged a dialogue between the respecttive representative of the associated partner, the project consortium and the audience on issues that were addressed in the presentation. The discussions served to align BASTA with the requirements of industry experts at an early stage of the project. A final discussion concluded the event. The discussions of the afternoon session are summarized in chapter 3.

Event Preparations and Subsequent Work

Preparations of the event focused on the identification of relevant stakeholders and interested parties. The invitation (Annex I) was distributed on November 7, 2019 (i.e. before the official project start). During initial planning up to 30 participants were expected. However, the number of attendees during the event amounted to 52. Numerous experts, who were not initially invited, registered for the event, which demonstrates the strong interest of the offshore UXO community in BASTA and the project's way forward.

A live video stream of the event was established, with the aim of allowing experts, who were not able to join the event on site, to follow the event (see Figure 1). The recording of the stream is available on YouTube via https://youtu.be/r6hTgXnVgTk. As the stream collapsed twice during the event, the video that is now available was edited and does not contain the full event. After the event, numerous experts, who were not present on site, approached the project team with postiive feedback on the stream, encouraging to continue this effort during future events. The maximum number of viewers of the live stream during the event was twelve. At the time of publication of this report, the resulting video has been viewed more than 150 times. A number of additional experts who could not attend the meeting, requested to be informed about the project by means of individual introductory telephone conferences and continuously through the BASTA newsletter.
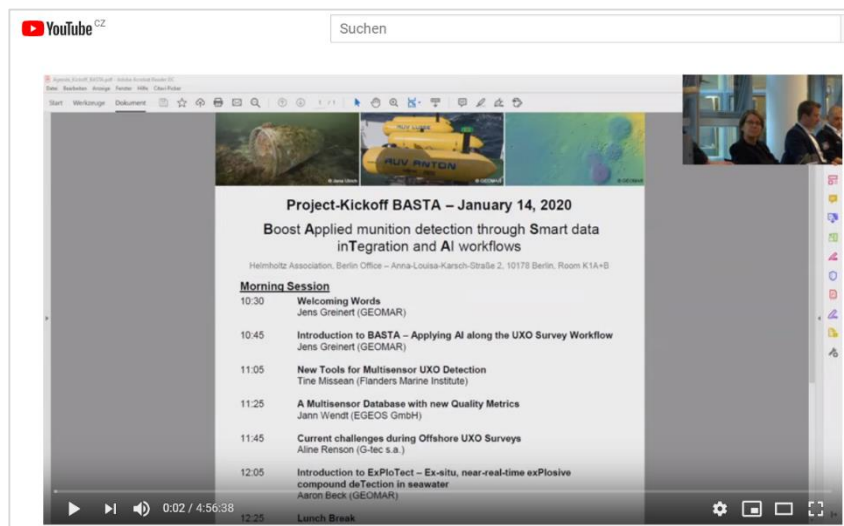

Figure 1: Screenshot of the video stream of the kick-off (© YouTube)

All presentations by project partners and associated partners, minutes of the subsequent discussions (see chapters 2 and 3), the list of participants, some photographs of the event and this report were made available on the project website (here).

Media Coverage

One week before the kick-off, interested journalists were invited to join a press conference that was held on the day of the event at 16:00. Two journalists attended the press conference and were informed on the issue of munitions in the sea in general, as well as the projects BASTA and ExPloTect. The resulting reports, were published by:

- Helmholtz-Zentrum: https://www.helmholtz.de/erde_und_umwelt/munition-im-meer/
- Die Welt

The press invitation lead to two additional interviews with BASTA representatives Jens Greinert and Torsten Frey, both of which were integrated in radio broadcasts, which were published by:

- Deutschlandfunk: https://www.deutschlandfunk.de/minensuche-im-meer-wie-forscher-munitionsaltlasten.676.de.html?dram:article_id=467839
- MDR

During the kick-off, a press release on BASTA was published, which resulted in several websites reporting on the initiation of the project. The following links lead to those reports:

- Labor Praxis: https://www.laborpraxis.vogel.de/altlasten-munition-im-meer-zuverlaessig-finden-a-896131/
- Täglicher Hafenbericht: https://www.thb.info/rubriken/single-view/news/jaehrlich-900-vorfaelle-mit-altmunition-in-see.html
- Informationsdienst Wissenschaft: https://idw-online.de/de/news729914
- Future Ocean: https://www.futureocean.org/de/cluster/aktuelles/meldungen/2020/2020_01_14_Munition_im_Meer_zuverlaessig_finden.php
- GEOMAR: https://www.geomar.de/news/article/munition-im-meer-zuverlaessig-finden/
- Planet Erde: https://www.planeterde.de/news/munition-im-meer-zuverlaessig-finden

All media coverage was also linked on the project website at https://www.basta-munition.eu/media-coverage.

Side event "Munition und Matjes"

The side event "Munition and Matjes" (Eng. "Munitions and matjes") was organized by the environmental ministry (MELUND) of the federal state of Schleswig-Holstein. It took place in the representation of the federal state of Schleswig-Holstein in Berlin at the day of the BASTA project kick-off from 16:45 until 20:00. An invitation to all BASTA project kick-off attendees was issued by MELUND representative Claus Böttcher.

The event served the purpose of connecting invited politicians and representatives of authorities with the researchers of BASTA and other stakeholders. The invitation was well received and numerous experts attended the side event (see Figure 2). During the event, a number of scientific posters were exhibited and food and drinks were served, to encourage mingling and informal discussions among experts.
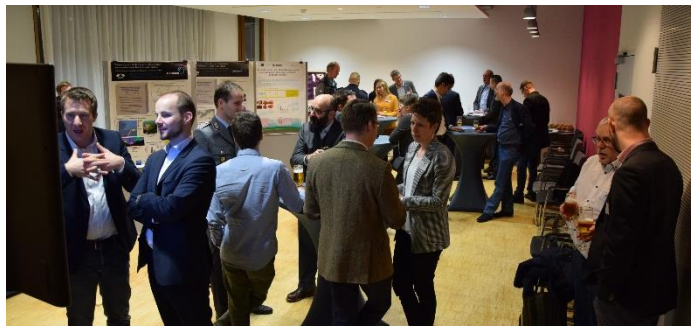

Figure 2: Numerous experts attended the side event "Munition and Matjes"

2. Minutes of the Morning Session

This section summarizes the most important points that were addressed during the discussions following the presentations of the project partners (see Figure 3). It does not describe the content of the presentations, since, due to the early stage in the project, they were based on the grant proposal. The project proposal is available on the project website (here).

Introductory BASTA presentation and partner presentation by Jens Greinert (GEOMAR)

- The AI algorithms are not meant to replace experts but rather to be applied as a supportive tool. It cannot be expected that the algorithms will discriminate all UXO targets in a way that no false positives will remain in target lists. There is a spectrum of discrimination. The algorithms are therefore not only going to provide a yes/no answer but rather a UXO probability value.
- At a later stage during the project, electromagnetic systems might be added to the sensor suite. They may be installed on the AUVs.

Partner presentation by Tine Missiaen (VLIZ)

- The 3D-sub-bottom profiler that will be used during the project was selected due to its high performance in terms of penetration depth, which is lower for other systems. However, a comparison with other systems may be conducted at a later stage. The funds in the project do not allow for the purchase of numerous systems, that are available on the market. However, data input from the stakeholders may help to conduct such a comparison. This type of comparison was strongly encouraged by the audience.

Partner presentation by Jann Wendt (EGEOS)

- The quality control of training data is of high importance. This is also true for the provision of meta data with the datasets, that serve to contextualize the datasets. Furthermore, the AI algorithms' capabilities depend strongly on the amount of data (and more specifically ground truthed

data) that are made available for training. All data will receive a quality flag before they are used for the training of AI algorithms.
- The training of algorithms is going to take place in an iterative way.
- The ground truthed data will be used to identify patters and correlations between the historic datasets and recently acquired survey datasets.

Partner presentation by Aline Renson (G-tec)

After this presentation, no discussion took place.

Introductory ExPloTect presentation by Aaron Beck (GEOMAR)

- The system that ExPloTect is interested in developing is an additional method for the technical detection of UXO, that is not meant to replace existing approaches. Among other reasons, this is due to the fact that the project's detection capabilities of buried and pristine objects are expected to be low.
- This system could be used to monitor remediation activities.
- Stakeholders are highly encouraged to take water samples that would support the project. There is no need to have additional personnel on board of ships as the taking of samples is very easy. However, well documented meta data make the evaluation of the samples more meaningful.
- Project partners emphasized that both BASTA and ExPloTect consortiums are willing to sign non-disclosure agreements with stakeholders for the provision of data or the taking of water samples, so that alignment on results takes place before the publication of results.

Figure 3: Every presentation was followed by an engaging discussion

3. Minutes of the Afternoon Session

This section lists the most important expectations and requests that were voiced by the presenters of the associated partners. It furthermore summarizes those points of the subsequent discussions, that are most relevant to the project. Some issues were stressed several times during the afternoon session. In this case, the following minutes summarize all relevant remarks under one bullet point instead of spreading them throughout the different presentations.

Presentation by Claus Böttcher (MELUND)

During the presentation, the following expectations and requests were made:

- Improve knowledge on the current state of individual offshore UXO objects
- Confirm the results of previously conducted German research project UDEMM

The discussion following the presentation lead to the following insights:

- Due to the recent decision of the German Conference of Environmental Ministers (UMK), the issue of offshore UXO has reached a critical level of attention in German federal and state level politics, which may lead to the issuance of further funding to deal with the issue. Further

national and international research projects may be funded if appropriate proposals are submitted.

- Numerous members of the audience signalled their readiness to share data if they get approval by their organizations. Other representatives expressed doubt about the willingness of national authorities and military to provide data for the training of neural networks. In addition, commercial interests may negatively affect the willingness to share data. Nonetheless it has been made clear that approaching the owner of the data (which are usually the employers and project owners) appears to be the best strategy to obtain industry data.
- A project with a three-year runtime (such as BASTA) is considered too short to sensibly deal with the huge amounts of data that is potentially available. A longer running initiative may work in favour of more sustainable use of data.
- It was mentioned that data stored by authorities is often only stored away and not used for further assessment. An appetite to push both authorities and military for the release of such data was expressed.

Presentation by Dorthe Reng Erbs-Hansen (Vattenfall) and Anja Drews (TennT)

During the presentation, the following expectations and requests were made:

- Well-proven improvements in survey techniques, also on a larger scale
- Comparison of results both on survey techniques and target recognition with present day common practice to precisely demonstrate improvements
- Transparency in methods and criteria for UXO target selection, especially for buried targets
- Define requirements for data quality
- Share partial results with stakeholders during project runtime
- Testing the utility of results in different settings outside of the BASTA project to ensure that the final results are readily useable
- Ensure wide European engagement in best-practice development to have widely accepted methods
- Anonymization of data input
- Specification of data formats for those data that were requested for the training of neural networks
- Establish an easy-to-use sharing mechanism for large amounts of data

The discussion following the presentation lead to the following insights:

- Overall, the project is considered a very ambitious endeavour.
- One participant expressed doubts about the sensor suite that was selected for the project. Focus of the criticism that was voiced, concerned the high energy consumption and "ghosting" of 3D-sub-bottom profilers on an AUV, as well as the high amount of magnetic noise that AUVs generate for integrated magnetic sensors. These issues were already investigated in the KAPITAS project and it was concluded that certain physical limitations cannot be overcome. It was clarified that during BASTA the 3D-sub-bottom profiler will be installed at the hull of the survey vessel, not on an AUV.
- An expectation of the stakeholders is, that the results generated in BASTA should not only be useful to the scientific community but also for real world applications. Audience members emphasized that project outcomes should increase efficiency with the aim of a cost reduction during surveys.
- The legal dimension of UXO surveys should not be underestimated. Based on the survey data and the subsequent data processing and interpretation, an EOD supervisor has to sign-off an area as UXO risk free. Accordingly, the AI based processing still needs to be comprehensible for these experts. Blind trust towards a "machine" will be difficult to gain. In addition, employers and authorities need to accept AI based processing. As a consequence, it was put into question, whether better target discrimination and therefore cost savings can be achieved.
- The project consortium offered to organize a workshop on machine learning for interested stakeholders, that may be integrated in the next BASTA stakeholder event. This will allow the staff who is performing the data processing to gain trust and understand the AI algorithms.

Presentation by Peter Frost (NKT)

During the presentation, the following expectations and requests were made:

- Help to reduce costs for employers by addressing the following pressing issues:
  - non-standardized and incomprehensive threat assessments and quantification of risk based off a single consolidated UXO legacy database
  - non-standardized and non-optimized data acquisition
  - subjective interpretation of data and identification of actual UXO
  - identification of a large amount of false-positives (lack of accurate target discrimination) [< 5% UXO]
- Develop a strategy to successfully roll out working algorithms and approaches to the industry
- Address near-shore areas with water depths below 20 m

The discussion following the presentation lead to the following insights:

- The audience supported the argument of highly different expectations towards the surveyor and a lack of definitions. It was suggested that such definitions should be established as a first step of the project. The project consortium is planning on addressing this issue through the development of quality metrics.
- The speaker underlined his view of the high subjectivity of the assessment of risks and that he believes that AI offers an opportunity, to create more objective results, that should still be monitored by an EOD expert. One participant expressed concerns about the level of expertise that many EOD experts possess. Another participant strongly disagreed with the opinion on highly subjective data interpretation as the entire process is already standardized.
- The high heterogeneity in risk assessment methods and resulting mitigation measures (e. g. stand-off distance, period of validity of ALARP certificates) was mentioned.

Presentation by Andrea Stolte (WWF)

During the presentation, the following expectations and requests were made:

- Identify synergies between BASTA and the issue of ghost nets with the aim of addressing the following issues:
  - Varying data quality
  - Numerous different types of objects that are related to ghost nets need to be identified
  - Non-automated evaluation of data
  - Subjective evaluation of data
- Reduce the number of false positive target points
- Alleviate the visual inspection of data
- Identify UXO that are contained in ghost nets to increase safety of net removal and risk assessment capacities

Final discussion chaired by Torsten Frey (GEOMAR)

During the final discussion, the project consortium expressed their wish to establish a more sustainable relationship with the audience. This relationship is meant to surpass the content of BASTA both in terms of the project content (i.e. offshore UXO related topics other than AI based survey) and the project duration (i.e. continuation after the conclusion of BASTA). The discussion lead to the following insights:

- There is no need to take a decision on joining such an initiative at this moment, as BASTA will be used to set up a framework and to establish working groups.
- The BASTA consortium was encouraged to add more detail, content and scope to the initiative, so that stakeholders can take a decision on whether they would like to join. This should go hand in hand with a gap analysis on industry needs. At the same time, stakeholders are encouraged to drive the initiative.
- Following an initial reluctance, several audience members expressed their interest in joining such an initiative.
- There are numerous networking opportunities to be gained from a joint initiative (e.g. authorities and employers; military and civil authorities).

4. List of Participants

Table 2 shows the list of participants, who attended the official BASTA project kick-off. In total, 52 participants attended the event. Representatives of BASTA project partners are highlighted in blue, representatives of associated partners are highlighted in green and representatives of partnering project ExPloTect are highlighted in red. The remaining participants are representatives of other companies and institutions that showed their interest in the BASTA project.

Table 2: List of participants to BASTA project kick-off

Name	First Name	Affiliation
Achterberg	Eric	GEOMAR Helmholtz Centre for Ocean Research Kiel
Baker	John	RPS Explosives Engineering Services
Barradas	Jose Felipe	Vlaams Instituut voor de Zee (VLIZ)
Beck	Aaron	GEOMAR Helmholtz Centre for Ocean Research Kiel
Böttcher	Claus	MELUND
Brighthouse	Jack	ALM GEOPHYSICS LIMITED
Brüning	Holger	K.U.M. Umwelt- und Meerestechnik Kiel GmbH
Drews	Anja	TenneT TSO GmbH
Erbs-Hansen	Dorte Reng	Vattenfall Vindkraft A/S
Frey	Torsten	GEOMAR Helmholtz Centre for Ocean Research Kiel
Frost	Peter	NKT HVC B.B.
Gilissen	Marco	FUGRO
Greinert	Jens	GEOMAR Helmholtz Centre for Ocean Research Kiel
Guldin	Dieter	SeaTerra GmbH
Häber	Rainald	Mull und Partner Ingenieurgesellschaft mbH
Hagen	Sebstian	Kampfmittelräumdienst Schleswig-Holstein
Hermans	Laurens	Vlaanderen (Departement mobiliteit en openbare werken)
Hoffman	Vincent	UXSolutions
Honeck	Ralf-Rüdiger	Femern A/S
Hübner	Harald	Offcon
Iversen	Claus	Femern A/S
Kaltofen	Tommy	Atlas Elektronik GmbH
Koske	Daniel	Thünen Institute of Fisheries Ecology
Künzel	Michiel	League Geophysics
Liebram	Sebstian	Landeskommando Schleswig-Holstein
Menzel	Peter	Universität Rostock
Missiaen	Tine	Vlaams Instituut voor de Zee (VLIZ)
Nebel	Leif	Eggers Kampfmittelbergung GmbH
Renson	Aline	G-tec s.a.
Rüggeberg	Thomas	Bundesministerium für Wirtschaft und Energie
Russ	Katharina	MELUND
Schiller	Christian	innogy SE
Schlenz	Bastian	Femern A/S
Schöttke	Lasse	Patzold, Köbke Engineers GmbH & Co. KG
Schraps	Johannes	SPD
Schwartz	Michael	Heinrich Hirdes EOD Services GmbH
Seidel	Marc	GEOMAR Helmholtz Centre for Ocean Research Kiel
Seppe	Machiels	Belgisch Militair
Seubring	Frank	Heinrich Hirdes EOD Services GmbH
Sprenger	Florian	Projektträger Jülich
Stender	Manfred	FUGRO OSAE GmbH
Stermann	Simon	Auswärtiges Amt
Stolte	Andrea	WWF
Süß	Wolfgang	Sensys Sensorik & Systemtechnologie GmbH
Thießen	Wolfgang	50 Hertz

van der Linden	Puck	League Geophysics
Vanstrealen	Annelies	Ørsted
Wehner	Daniel	EGEOS GmbH
Wendt	Jann	EGEOS GmbH
Wigh	Mark David	Ørsted
Wilckens	Julian	Projektträger Jülich
Wöhler	Joachim	Umweltministerium Niedersachsen

Annex I

Project-Kickoff BASTA – January 14, 2020

Boost Applied munition detection through Smart data inTegration and AI workflows

Helmholtz Association, Berlin Office – Anna-Louisa-Karsch-Straße 2, 10178 Berlin, Room K1A+B

Morning Session

10:30	**Welcoming Words**	
	Jens Greinert (GEOMAR)	

10:45 **Introduction to BASTA – Applying AI along the UXO Survey Workflow**
Jens Greinert (GEOMAR)

11:05 **New Tools for Multisensor UXO Detection**
Tine Missean (Flanders Marine Institute)

11:25 **A Multisensor Database with new Quality Metrics**
Jann Wendt (EGEOS GmbH)

11:45 **Current challenges during Offshore UXO Surveys**
Aline Renson (G-tec s.a.)

12:05 **Introduction to ExPloTect – Ex-situ, near-real-time exPlosive compound deTection in seawater**
Aaron Beck (GEOMAR)

12:25 **Lunch Break**

Afternoon Session

13:30 **Project Expectations and Requests**
Claus Böttcher (MELUND Schleswig-Holstein)
Dorthe Rent Erbs-Hansen (Vattenfall Vindkraft A/S)
Peter Frost (NKT HVC B.V.)
Anja Drews (TenneT TSO GmbH)
Andrea Stolte (WWF)

14:30 **Discussion – How to Participate and Support BASTA**
Moderator: Jens Greinert (GEOMAR)

With the contribution of the European Maritime and Fisheries Fund of the European Union
Grant Agreement No BASTA: 863702
Grant Agreement No ExPloTect: 863693

For Registrations and Questions:

BASTA@GEOMAR.de
+49 431 600 2507

Partners:

GEOMAR   VLIZ   EGEOS   G-tec