



MINIATURE TAG DEVELOPMENT “MINTAG PROJECT”

Project description- version 050721

- **A TOOL FOR CETACEAN RESEARCH & MANAGEMENT IN THE NA/NP**
- **A HIGH PROFILE PROJECT**
- **A FLAG SHIP FOR NAMMCO & JAPAN**
- **A NAMMCO – JAPAN RESEARCH COOPERATION**

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1. INTRODUCTION

The project originally called Super-Tag project is now renamed Miniature Tag Project or MINTAG Project, as its essence is to develop smaller and lighter tags than the ones existing on the market today. The new tags should have better ballistic performance for long-distance deployments. These miniaturised tags will then be totally implantable, with only the antenna above the skin surface. They can be used on smaller whale species (smaller diameter) and fast swimming species (as implantable tags generate less drag and vibration). Their longevity will be longer, as the retention time should be increased (reduced impact meaning reduced rejection risk) and the technology will be improved with a lower battery consumption. It is also hoped that these miniaturised tags, which will be less intrusive in terms of welfare, will therefore generate a reduced behavioural impact. The plan is to develop one or two tags, one small enough to be used on pilot whales, and if possible smaller species, but that can be used also on minke whales, and one larger that is suited for minke & bottlenose whales but that can be used on larger species, such as Bryde's, sei and fin whales.

The MINTAG Project, if successful, has a strong potential to become a high-profile project and a flag ship for NAMMCO. Indeed, this project has the interest of several research groups, e.g., from the US and Australia, which have discussed the necessity for such a development of miniaturised tags, but do not have the means of developing such tags on their own.

External funding is needed to secure funding for the Super-Tag Project. External funding is needed to secure funding for the Super-Tag Project. Japan has reiterated its willingness to participate in the project and provide funding. The Council of NAMMCO is happy to welcome Japan as full partner to the project.

2. BACKGROUND

NAMMCO countries and Japan are exploiting lesser-known species of baleen whales such as fin, minke, sei and Bryde's whales, as well as pilot whales. Questions as essential as the following are still without clear answers for some of these species/stocks of primary interest to NAMMCO and Japan, although several plausible stock structure hypotheses have been developed.

- Where do these whales spend the winter?
- Are there separate stocks that need to be managed separately?
- What is the habitat use of these whales and how do they react to oceanographic changes?
- What is the overlap between key species habitats and maritime activities?
- What is the area from which the hunted population is recruited? - in other words, how large is the exploited stock?

Tracking of marine mammals by satellite has long been recognized as one of the most important and promising techniques available for studies of cetacean movement, migration, behaviour, diving, stock identity and habitat use. It brings unvaluable information in terms of sounds management, in the sense that it can help defining the geographical range and therefore the size of the hunted population.

For example, in the specific case of pilot whales, the different focus groups dealing with pilot whale assessment (1996, 2008, 2011) have reiterated that the primary concern remains the identification of the geographical area from which the pilot whales harvested in the Faroes comes from, the impact of the hunt being very different depending on the size of the exploited stock. They indicated that tagging in other areas than the Faroes Islands (where the whales can be handled) would be desirable to not only learn how far the whale venture but where they come from and recommended cooperation with Iceland and Greenland. SC 20 (2013) again recommended that more tracking data

be collected, especially from offshore areas, with a focus on the period during sightings surveys (July-August), and off Iceland and Greenland.

Similar issues remain with the other hunted whale species in the North Atlantic and Pacific and for which stocks are not well defined. Tagging in combination with results derived from biopsy/genetic analyses will be the most useful tool for stock structure and movement.

However, there are no standard techniques for instrumentation and tracking of these fast-moving species. Logistical and behavioural difficulties have so far precluded long-term tracking of minke, fin, sei and Bryde's whales as well as pilot whales in the North Atlantic and North Pacific, with specific challenges both in terms of instrumentation at sea and tag longevity. It is of fundamental importance to develop smaller and more reliable tracking instruments, as well as better methods for deploying the tags, which do not rest on the retention of the whale but can be deployed at longer distance (c. 25 m). Tags embedded into the flesh will allow a longer retention of the tag and will be less disturbing in terms of swimming behaviour. However present tags are too large, difficult to deploy in terms of ballistic and induce rejection process. Smaller tag will be easier to deploy, less invasive in terms of welfare and will also provide better opportunities for longer retention.

3. OBJECTIVES

Dedicated and coordinated effort is required to develop tags and instrumentation techniques that can be used routinely in NAMMCO member countries and Japan for obtaining crucial information on geographical distribution and movements in order to improve the management of the lesser-known fast-swimming baleen whales and the pilot whales of primary interest to NAMMCO and Japan.

The NAMMCO SC has therefore proposed a collaborative project to develop a new satellite tag suited for use on these whales of most interest to NAMMCO and a program of coordinated research using this tag to study movements and changes in occurrence in the North Atlantic.

The Miniature Tag Development or MINTAG Project covers:

- a) The development of two smaller and lighter, satellite transmitters with optimal ballistic performance for long-distance deployments
- b) A schedule and common protocol for deployments of the transmitters, and systematic testing of their ballistic performance
- c) A common database for the archiving and organisation of data and results
- d) Common publication of the results
- e) Active dissemination of the project progress and result to the wider public through a project website and education material, scientific and wider public publication, presentation in international fora.

The data on distribution and movements, the project aims at generating, are missing for a thorough understanding - and therefore sound management - of lesser-known but exploited species such as minke, fin, sei, Bryde's and pilot whales. The MINTAG Project will also reinforce the cohesion of the SC, which apart from the NASS, has never conducted any cooperative research project. All Member Countries will be represented in the project Steering Group and analyses and publications will be generated, at least partly, in common.

The MINTAG Project, if successful, has a strong potential to become a high-profile project and a flag ship for NAMMCO, even more than NASS has been, as the developed tags have the potential to be used all over the world. The results obtained through the project itself, both in the Atlantic and the Pacific, will be feeding discussion and supporting assessments in many bodies, including the IWC.

4. PROJECT PARTNERS, LEAD AND ADMINISTRATOR

NAMMCO member countries are initiator of and partner to the project. Japan is welcomed as a full partner.

The project will be led by a Scientist from a NAMMCO Country, Prof. Mads Peter Heide-Jørgensen from the Greenland Institute of Natural Resources.

The project will be administered by NAMMCO, through the NAMMCO Secretariat.

The project will be led by a Steering Group which will refer to the NAMMCO Finance and Administration Committee. The five participating countries will nominate scientists with expertise in whale tracking. The Secretariat of NAMMCO and Japan Fisheries Agency (in the person of H. Moronuki, International Affairs Division) will also be member of the Steering Group.

The following Scientists have been nominated to the Steering Group:

- FO: B. Mikkelsen (FAMRI)
- GL: R. Guldborg Hansen (GINR)
- IS: G. Víkingsson (MFRI)
- NO: C. Lydersen (NPI), N. Øien & M. Biuw (HFI)
- JP: L. Pastene and K. Konishi (ICR)

5. PROJECT ORGANISATION

5.1 TAG DEPLOYMENT

Tags will be deployed by all the countries and theoretically all partners will receive 50 tags to deploy. However, the number of tags to be deployed by each country will be assigned by the Steering Group in relation to the realistic local chance of instrumentations, i.e., depending on the concentration of the target species in the waters of each country.

As an example, Norway will likely be charged of deploying more minke whale tags than other countries, as the concentration of minke whales is much higher and more spread in time in Norwegian waters than off the other countries. Scientists from other countries will support this deployment by participating in the field work.

Japan is asked to deploy, at a minimum, its own share of tags (50 tags over the 4 deployment years 2022-2025).

5.2 PROJECT MILESTONES & TENTATIVE TIMELINE

The project will run for five years from when launched, this hopefully July 2021, and will therefore run until June-July 2026.

5.2.1 Milestones

The project is divided into three phases:

- **The development phase – 2021 (July)-2022:** the “idea/creative/inventor” phase with the development of the new tag(s) and long-distance deployment tool(s)
- **The testing phase - 2022-2023** testing of the penetration of the tags and attachment resistance using dummy tags & deployment of 25 “test tags”
- **The deployment, data collection, and analyses phase – 2022-2025:** deployment of the 225 tags over three years (2022-2025), data collection (2022-2025) and analysis and publication of results (2023-2026).
- **Publication & final reporting & workshop phase – 2026 (June):**

All along these three phases, the progress of the project, the movements of the tagged whales and the overall results will be actively disseminated to a wider public through the project website. If external funding becomes available, the website and complementary educational material will be made accessible in the partners' language and in English and will be therefore open to a wider public.

5.2.1 Tentative timeline

2021 – 2022: Development phase

July-August 2021

- Virtual Meeting of the Steering Group and agreement on required tags specifications
- Development of tender material for manufacturers
- Contact with potential manufacturers and request for offer

Summer 2021

- Research on legal aspects of contracts

Autumn 2021

- Choice of manufacturer
- Development of project website

December 2021

- Hybrid (Face to face and virtual) meeting of the Steering Group with manufacturers in connection with the Biennial Conference of the Marine Mammal Society

Winter & spring 2022

- Annual Spring reporting to the NAMMCO Council and Japan Fisheries Agency
- Development of the tags by manufacturers

2022-2023: Testing phase

Spring 2022

- Development of instrumentation protocol, which should be used for and tested during the deployment of the test tags

Summer-Autumn 2022

- Test of ballistic performance on (or big chunks of) a minke whale and a pilot whale carcass
- Experiment with dummy tags on whale carcasses
- Deployment of 25 test tags

Autumn 2022

- Finalisation of instrumentation protocol, based on the experience gained with the deployment of the test tags
- Deployment of the first tags closely following the final deployment protocol
- Annual reporting to the NAMMCO Council and Japan Fisheries Agency

Spring 2023

- Testing eventually continuing in 2023 if needed

2022 – 2025: Tag deployment

Autumn 2022 – Winter 2025

- Development of database
- Deployment of tags

- Data collection
- Analyses
- Dissemination to wider public
- Annual Spring reporting to the NAMMCO Council and Japan Fisheries Agency
- **2025 – 2026: Analyses & preparation of publications**

2026: Project completion

- Completion of analyses and publications
- End-project workshop (presentation of major results both regarding tag performance relative to deployment strategy and whale species movements)
- Final reporting to the NAMMCO Council and Japan Fisheries Agency

5.3 PROJECT DELIVERABLES

- Result of the systematic testing of the ballistic characteristics of both tags
- Detailed common deployment protocol for different deployment strategies for achieving a reliable comparative analysis of deployment success.
- Deployment data for performance comparison of different deployment strategies for a large sample of instrumentation

5.3.1 Annually

- Annual report to the SC (mid-January) & the Council of NAMMCO (end of February) as well as Japan Fisheries Agency (end of March) on the progress of the project and the success in tag deployment
- Annual financial report to FAC (end of January) and Japan Fisheries Agency (end of March/end of Japan's fiscal year)

5.3.2 End of project

- Analysis of the comparative success of the different instrumentation strategies tested
- Analysis and reporting on movement data
- Database on instrumentation results (metadata)
- Database on whale position (metadata)
- Two miniaturised tags
- Best tagging protocol for these tags for each target species
- Project website and education material
- International end-of-workshop/conference
- Scientific publications, with at least one common publication by the Steering Group on deployment results
- Presentation in different national and international scientific and non-scientific fora
- Final financial and technical reports.

5.3.3 Reference to the project and acknowledgment of NAMMCO input

A standard way of acknowledging the project and the input of NAMMCO & Japan Fisheries Agency will be developed, which shall be used in any publications or presentations that will be reporting on the project and its results.

6. PROJECT COST & FINANCING PLAN AS PROPOSED BY NAMMCO FAC

Project cost, overall and country specific project financing, as well as financing plan for each three phases of the project are given below.

A few adjustments to the project proposal and funding presented to the Council have been recommended by FAC and includes the following.

- The project is still running over five years but commencing in July 2021 (expected launching date) and thus finishing in June/July 2026
- A End-of-project Workshop has been added in the final year 2026 to enhance the high profile of the project
- The description now clearly indicates that one to two types of tags will be developed, a larger one targeting minke whales and a smaller tag targeting pilot whales
- The cost of the acquisition of carcasses for testing the tags' penetration and retention properties on whale carcasses has been added, as well as the cost of transporting a few scientists (one per partner) to the testing sites (likely Norway and the Faroe Islands)
- Figures have been rounded

6.1 FINANCING PRINCIPLES

All direct costs, including the cost of the tags (50*4=200 for NAMMCO and 50 for Japan) are merged in a common direct cost pool.

NAMMCO Countries allocate funding to the common direct cost pool at the level possible for each country, as indicated in the financing plan.

In-kind costs will be managed and covered directly by each country, without transiting through NAMMCO. In-kind costs will be reported annually to the project, so they can be included in the project accounting.

External funding can be sought. However, GL do not wish to receive funding from NGOs, in respect of the financing principles of the Government of Greenland.

6.2 PROJECT COST AND FINANCING PLAN

Table 1 provides the cost and financing plans for the overall project.

Table 1: Overall project cost and financing plan

Overall project	TOTAL COST	NAMMCO Total	Japan
Direct contributions	10,315,000	4,185,500	6,129,500
%		41 %	59 %
In kind contributions	16,116,000	13,668,000	2,448,000
%		85 %	15 %
Total	26,431,000	17,853,500	8,577,500
%		68 %	32 %

As far as the financing plan is now, **NAMMCO will contribute to 68 % of the total cost** of the project. NAMMCO contribution to the direct costs will be of 41% and to the in-kind costs (field work) 85%.

- NAMMCO Member Countries have committed to fund the development phase and the testing phase, at, as a minimum, the level indicated in the financing plan.
- NAMMCO Member Countries have committed to continue with phase 3, if the new tags exhibit the requested characteristics (incl. good retention and longer longevity).
- Greenland and Norway have indicated their planned allocation for phase three, which represents their minimum contribution if the project goes ahead.

Table 2 provides the cost and financing plans for the three project phases, while **Table 3** provides a detailed cost for the three project phases. It should be noted that the in-kind cost of deploying the 25 test tags in the *Testing Phase* (i.e., the cost of the field work for deploying the 5 test tags) is in fact included in the *Deployment Phase*, as too unreliable to divide between phase 2 and 3.

6.3 POTENTIAL PARTICIPATION OF EXTERNAL PARTNERS

Scientists from USA and Australia have expressed their interest in the project, at least its outcome, i.e., the developed miniaturised tags. The Steering Group will investigate whether other countries would be interested in, if not joining the project directly, committing to buying the developed tags. This may allow to share the development costs, or the manufacturer may be willing to fund some of the development costs if such commitment exists.

7. PROJECT EVALUATION

7.1 SUCCESS CRITERIA

- Construction of two miniaturised tags with optimal ballistic performance for long distance (c. 25m) deployment on fast-swimming whales
- Penetration and retention of the tag on a whale carcass
- Development of a solid detailed common deployment protocol for different deployment strategies
- Obtention of detailed deployment data for performance comparison for a large sample of instrumentation
- Retention of tags on the different whale species for period close to or over a year
- Long-time tracking of key species

7.2 RISK ASSESSMENT

Risks associated to the project are of three kinds

- Longer time frame needed for development or deployment
- Development of the new tags possible but at a higher cost
- Tags cannot be developed with the expected/required characteristics regarding size, lightness and ballistic characteristics.

In the unlikely event that the miniaturised tags cannot be developed with the expected characteristics within the defined budget and expected timeframe, future options will be discussed by the Steering Group and the NAMMCO SC that will make recommendation to Council for best options on how to proceed.

The default could be that the already existing technology with its obvious limitations with regard to the target species be used in a large and coordinated deployment project. In that case deployment protocols could be strictly developed to test different deployment techniques and strategies, which has never been done so far. This would be useful, as it would help enhancing the success rate of present tagging tools.

Table 2: Overall Cost & Financing Plan for the 3 project phases

Phase 1: Development 2021-2022	PROJECT TOTAL	NO	FO	GL	IS	Commission	NAMMCO Total	Japan
2021	1,315,000	595,000	85,000	40,000	0	50,000	770,000	545,000
2022	855,000	180,000	74,000	200,000	50,000	50,000	554,000	301,000
Total direct contribution	2,170,000	775,000	159,000	240,000	50,000	100,000	1,324,000	846,000
%		36 %	7 %	11 %	2 %	5 %	61 %	39 %
In kind contribution	506,000	102,000	20,000	111,000	40,000	0	273,000	233,000
%		20 %	4 %	22 %	8 %	0 %	54 %	46 %
Total Development	2,676,000	877,000	179,000	351,000	90,000	100,000	1,597,000	1,079,000
%		33 %	7 %	13 %	3 %	4 %	60 %	40 %

Phase 2: Testing 2022-2023	PROJECT TOTAL	NO	FO	GL	IS	Commission	NAMMCO Total	Japan
Total testing	907,000	410,000	-	17,000	0	50,000	477,000	430,000
%		45 %	0 %	2 %	0 %	6 %	53 %	47 %

Phase 3: Deployment & Results 2022-2026	PROJECT TOTAL	NO	FO	GL	IS	Commission	NAMMCO Total	Japan
2022	1,469,000	320,000		17,000		50,000	387,000	1,082,000
2023	2,908,000	700,000		70,000		175,000	945,000	1,963,000
2024	2,228,000	332,500		70,000		180,000	582,500	1,645,500
2025	433,000	150,000		70,000		100,000	320,000	113,000
2026	200,000	50,000				100,000	150,000	50,000
Total direct contribution	7,238,000	1,502,500	-	227,000	-	605,000	2,334,500	4,853,500
%		22 %	0 %	1 %	0 %	3 %	26 %	74 %
In kind contribution	15,610,000	7,922,000	1,060,000	2,663,000	1,750,000	0	13,395,000	2,215,000
%		51 %	7 %	17 %	11 %	0 %	86 %	14 %
Total Deployment	22,848,000	9,424,500	1,060,000	2,890,000	1,750,000	605,000	15,729,500	7,068,500
%		41 %	5 %	13 %	8 %	3 %	69 %	31 %

Table 3: Detailed cost-and financing plan of the project three phases

Year	Break down of costs per phase & year	Project cost NOK	DIRECT CONTRIBUTIONS						IN-KIND CONTRIBUTIONS (EXCLUDING OVERHEADS)						
			NO	FO	GL	IS	Commis- sion	JP	NO	FO	GL	IS	JP	TOTAL	
2021-2022	DEVELOPMENT 2021-2022														
2021	Development phase 1														
	Part 1 of contract on development costs	1,125,000													
	Project administration & legal advice on contract/s	190,000													
	Total	1,315,000	595,000	85,000	40,000		50,000	545,000	102,000	20,000	111,000	40,000	233,000	506,000	
2022	Development phase 2														
	Part 2 of contract on development costs	855,000	180,000	74,000	200,000	50,000	50,000	301,000							
	TOTAL DEVELOPMENT	2,170,000	775,000	159,000	240,000	50,000	100,000	846,000							
2022-2023	TESTING 2022-2023														
2022-2023	Purchase of 10 dummy tags @ 2000 NOK	20,000													
	Purchase minke and pilot whale carcasses + scientists travel to test sites	150,000													
	Purchase of 25 test tags @ 25000 NOK	625,000													
	Argos fees (25 test tags)	47,000													
	Project administration & coordination	65,000													
	TOTAL TESTING	907,000	410,000		17,000		50,000	430,000							
2022-2026	DEPLOYMENT, DATA COLLECTION & EXPLOITATION 2022-2026														
2022	Creation of the project's website	125,000													
	Purchase of 50 tags for deployment in the NA & NP	1,250,000													
	Argos fees (50 tags)	94,000													
	Sum deployment 2022	1,469,000	320,000		17,000		50,000	1,082,000	215,000	150,000	489,000	190,000	443,000	1,487,000	
2023	Purchase of 100 tags for deployment in the NA & NP	2,500,000													
	Argos fees (100 tags)	188,000													
	Establishment of a database for files & photos	125,000													
	Project administration & coordination	95,000													
	Sum deployment 2023	2,908,000	700,000		70,000		175,000	1,963,000	3,507,000	370,000	787,000	645,000	548,000	5,857,000	
2024	Purchase of 75 tags for deployment in the NA & NP	1,875,000													
	Argos fees (for 100 tags in case some still work)	188,000													
	Maintenance of an updated database and website	70,000													
	Project administration & coordination	95,000													
	Sum deployment 2024	2,228,000	332,500		70,000		180,000	1,645,500	3,507,000	370,000	787,000	645,000	548,000	5,857,000	
2025	Argos fees (for 100 tags in case some still work)	188,000													
	Maintenance of an updated database and website	70,000													
	Project administration, incl. Project reporting	175,000													
	Sum deployment 2025	433,000	150,000		70,000		100,000	113,000	591,000	150,000	489,000	230,000	443,000	1,903,000	
2026	Final Reporting and Project Workshop	200,000	50,000				100,000	50,000	102,000	20,000	111,000	40,000	233,000	506,000	
	TOTAL DEPLOYMENT	7,238,000	1,552,500		227,000		605,000	4,853,500	7,922,000	1,060,000	2,663,000	1,750,000	2,215,000	15,610,000	
TOTAL	26,431,000	10,315,000	2,737,500	159,000	484,000	50,000	755,000	6,129,500	8,024,000	1,080,000	2,774,000	1,790,000	2,448,000	16,116,000	