

APPLICATION FOR CONSENT TO CONDUCT MARINE SCIENTIFIC RESEARCH  
IN AREAS UNDER NATIONAL JURISDICTION OF  
... UNITED KINGDOM...

Date : October 10<sup>th</sup> , 2006

**1 - GENERAL INFORMATION**

**1.1. Cruise name and/or number : SEPIA**

**1.2. Sponsoring institution :**

Name : Ifremer  
Address : 155, rue Jean-Jacques Rousseau  
92138 Issy les Moulineaux  
Phone : 33 (0)1.46.48.21.00 Fax : 33 (0)1.46.48.21.21  
Director : Jean-Yves Perrot

**1.3. Scientist in charge of the project :**

Name : Chichery Raymond  
Address : Laboratoire de Psychophysiologie (EA 3211)  
Esplanade de la Paix  
14032 Caen Cedex, France  
Phone : (33)231565519 Fax : (33)231565600  
Email : raymond.chichery@unicaen.fr

**1.4. Scientist from ..... involved in the planning of the project :**

Name :  
Idem (see above)  
Address :

Phone : Fax :

**1.5. Submitting officer:**

Name : Olivier Quedec  
Address : Ifremer Centre de Brest - Secteur Programmation Flotte  
B.P. 70 - 2980 Plouzané  
Phone : 33 (0)2.98.22.44.43 Fax : 33(0)2.98.22.44.55  
Email : [olivier.quedec@ifremer.fr](mailto:olivier.quedec@ifremer.fr)

## 2 - DESCRIPTION OF THE PROJECT

### 2.1. Nature and objectives of the project :

Collect of live cephalopods (cuttlefish) for scientific research of EA 3211 (Physiologie du comportement des céphalopodes) University of CAEN, France  
The field of research of the E.A. 3211 is represented by a behavioural neurosciences approach of learning and memory processes in cuttlefish *Sepia officinalis*. We particularly studied a group of central nervous structures, called the vertical lobe system, which are involved in memory processes.

### 2.2. Relevant previous or future research cruises :

Collect of live cuttlefish in the Channel “baie des casquets”

### 2.3. Previously published research data relating to the project :

#### Publications 2000-2006.

M.P. Halm, V. Agin, M.P. Chichery & R. Chichery : Effect of aging on manipulative behavior in the cuttlefish, *Sepia*. *Physiol. Behav.* **68** (4), 543-547 (2000).

L. Dickel, J.G. Boal & B.U. Budelmann : The effect of early experience on learning and memory in cuttlefish. *Dev. Psychobiol.* **36** (2), 101-110 (2000).

V. Agin, R. Chichery & M.P. Chichery : Effects of learning on cytochrome oxidase activity in cuttlefish brain. *NeuroReport* **12** (1) 113-116 (2001)

L. Dickel, M.P. Chichery & R. Chichery : Increase of learning abilities and maturation of vertical lobe complex during post-embryonic development in the cuttlefish. *Dev. Psychobiol.* **39** (2), 92-98 (2001).

M.P. Halm, M.P. Chichery & R. Chichery : The role of cholinergic networks of the anterior basal and inferior frontal lobes in the predatory behavior of *Sepia officinalis*. *Comp. Biochem. Physiol. A*, **132**, 267-274 (2002).

R. Chichery : Système nerveux, comportements, apprentissage et nociception chez les céphalopodes. *Sci. Tech. Anim. Lab.* **27**, 32-36 (2002).

M.P. Halm, M.P. Chichery & R. Chichery : Effect of nitric oxide synthase inhibition on the manipulative behaviour of *Sepia officinalis*. *Comp. Biochem. Physiol. C*, **134**, 139-146 (2003).

V. Agin, R. Chichery, E. Maubert & M.P. Chichery : Time-dependent effects of cycloheximide on long-term memory in the cuttlefish. *Pharmacol. Biochem. Behav.* **75** (1) 141-146 (2003).

C. Bellanger, F. Dauphin, M.P. Chichery & R. Chichery : Changes in cholinergic enzyme activities in the cuttlefish brain during the memory formation. *Physiol. Behav.* **79** (4-5) 749-756 (2003).

P. Domingues, R. Poirier, L. Dickel, E. Almansa, A. Sykes & J.P. Andrade : Effects of culture density and different live prey on growth and survival of young cuttlefish, *Sepia officinalis* (Linnaeus, 1758). *Aquaculture International*, **11**, 225-242 (2003).

R. Poirier, R. Chichery & L. Dickel : Effects of rearing conditions on sand-digging efficiency in juvenile cuttlefish (*Sepia officinalis*). *Behav. Process.* **67**(2), 273-279 (2004).

- A.S. Darmaillacq, L. Dickel, M.P. Chichery, V. Agin & R. Chichery : Rapid taste-aversion learning in adult cuttlefish (*Sepia officinalis*). *Anim. Behav.* **68**, 1291-1298 (2004).
- A.S. Darmaillacq, R. Chichery, R. Poirier & L. Dickel : The effect of early feeding experience on subsequent prey preference by cuttlefish, *Sepia officinalis*. *Dev. Psychobiol.* **45**(4) 239-244 (2004).
- R. Poirier, R. Chichery & L. Dickel : Effect of early experience on maturation of body patterns in juvenile cuttlefish (*Sepia officinalis*). *J. Comp. Psychol.* **19** (2) 230-237 (2005).
- S. Komak, J.G. Boal, L. Dickel & B.U. Budelmann : Behavioural responses of juvenile cuttlefish (*Sepia officinalis*) to local water movements. *Mar. Freshwater Behav. Physiol.* **38** (2) 117-125 (2005).
- C. Bellanger, M.P. Halm, F. Dauphin & R. Chichery : *In vitro* evidence and age-related changes for nicotinic but not muscarinic acetylcholine receptors in the central nervous system of *Sepia officinalis*. *Neurosciences Letters*, **387**, 162-167 (2005).
- A.S. Darmaillacq, R. Chichery, N. Shashar & L. Dickel : Early familiarization overrides innate prey preference in newly-hatched *Sepia officinalis* cuttlefish. *Anim. Behav.* **71** (3) 511-514 (2006).
- Agin V., Chichery R., Chichery M.P., Dickel L., Darmaillacq A.S., Bellanger C. : Behavioural plasticity and neural correlates in adult cuttlefish. *Life and Environment*, in press (2006).
- Dickel L., Darmaillacq A.S., Poirier R., Agin V., Bellanger C., Chichery R. : Behavioural and neural maturation in cuttlefish, *Sepia officinalis*. *Life and Environment*, in press (2006).
- V. Agin, R. Chichery, L. Dickel & M.P. Chichery : "The prawn-in-the tube" procedure in the cuttlefish : habituation or passive avoidance learning ? *Learn. Mem.* **13**, 97-101 (2006).
- C. Alves, R. Chichery, J. Boal & L. Dickel : Orientation in the cuttlefish, *Sepia officinalis* : response versus place learning. *Animal Cognition*, in press (2006).
- V. Agin, R. Poirier, R. Chichery, L. Dickel & M.P. Chichery : Developmental study of multiple memory stages in the cuttlefish, *Sepia officinalis*. *Neurobiology of Learning and Memory*, in press (2006).
- Boyer C., Maubert E., Charnay Y. & Chichery R.: Distribution of Neurokinin A-like and Serotonin immunoreactivities within the vertical lobe complex in *Sepia officinalis*. *J. Comp. Neurol.*, en révision (2006).
- N. Graindorge, C. Alves, R. Chichery, L. Dickel & C. Bellanger : Effects of dorsal and ventral vertical lobe electrolytic lesions on spatial learning and locomotor activity in *Sepia*. *Behavioural Neuroscience*, in press (2006).
- C. Alves, A.S. Darmaillacq, N. Shashar & L. Dickel : Field and laboratory observations of *Sepia* (*Doratosepion*) *elongata* d'Orbigny, 1845. *Veliger*, in press (2006).
- A.S. Darmaillacq, R. Chichery & L. Dickel : Food imprinting, new evidence from the cuttlefish, *Sepia officinalis*. *Biology Letters* in press (2006).

### 3 - METHODS AND MEANS TO BE USED

#### 3.1. Particular of vessel

Name : *GWEN DREZ*  
Nationality : France  
Owner : Ifremer  
Operator : Genavir  
Overall length : 25 meters  
Maximum draught : 3.5 meters  
Net tonnage : 32 Tx  
Gross tonnage : 106.31 Tx  
Propulsion : Diesel  
Maximum speed : 10 knots  
Call sign : FNIB  
Method and capability of communication (including telex, frequencies) :  
*Standard auto : 06.80.58.05.58 - Fax : 06.19.49.76.963*  
*Tel satellite : 00.870.7.624.855.73 - Fax : 00.870.7.624.855.75*  
*Email : [GW.Commandant@ifremer.fr](mailto:GW.Commandant@ifremer.fr)*  
Name of master : Xavier Guilcher  
Number of crew : 7  
Number of scientists on board : 5

#### 3.2. Aircraft or other craft to be used in the project :

No

#### 3.3. Particulars of methods and scientific instruments :

Types of samples and data	Methods to be used	Instruments to be used
Cephalopods	trawling	Trawl

#### 3.4. Indicates whether harmful substances will be used :

No

#### 3.5. Indicate whether drilling will be carried out :

No

#### 3.6. Indicate whether explosives will be used :

No

#### 4 - INSTALLATIONS AND EQUIPMENTS

Details of installations and equipments (dates of laying, servicing, recovery, exact locations and depth)

No

#### 5 - GEOGRAPHICAL AERAS

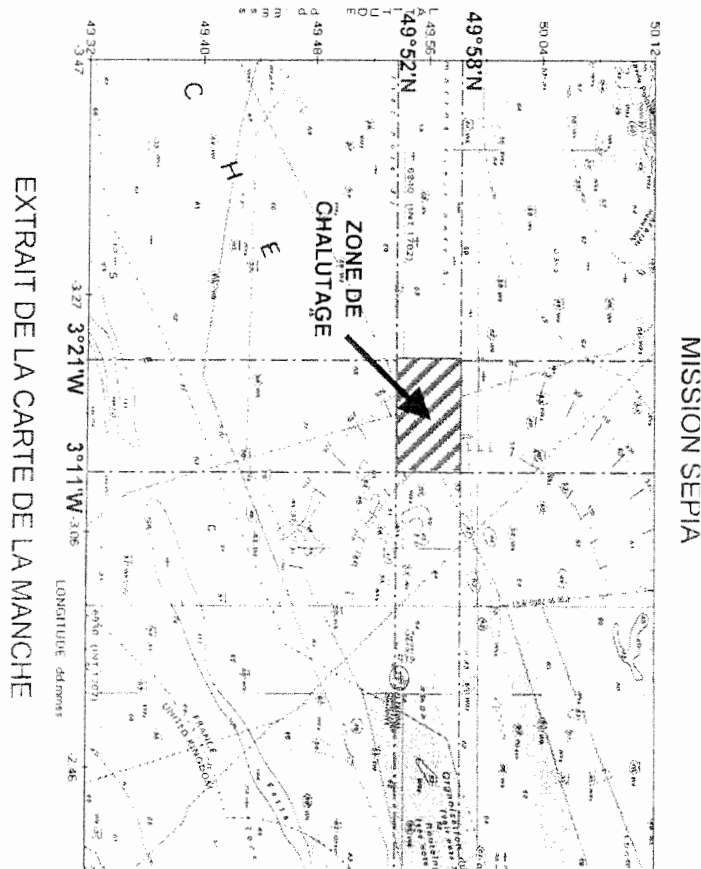
5.1. Indicate geographical areas in which the project is to be conducted (with reference in latitude and longitude) :

Latitude 49°50' W 50°00'W

Longitude 003°30'W 003°00'W

5.2. Attach chart(s) at an appropriate scale showing the geographical areas of the intended work and, as far as practicable, the positions of intended stations, the tracks of survey lines, and the locations of installations and equipment :

Baie des Casquets



## 6 - DATES

**6.1 Expected dates of first entry into and final departure from the research area of the research vessel :**

**Entry** date : 20/01/07

**Departure** date : 20/02/07

**6.2 Indicate if multiple entry is expected :**

No

## 7 - PORTS CALLS

**7.1. Dates and names of intended ports of call in ..... .**  
**CHERBOURG (France)**

**7.2. Any special logistical requirements at ports of call :**

**7.3. Name/Address/Telephone of shipping agent (if available)**

## 8 - PARTICIPATION

**8.1. Extent of which ..... will be enabled to participate or to be represented in the research project :**

No

**8.2. Proposed dates and ports for embarkation/disembarkation :**

**Start** date :

**End** date :

**9 - ACCESS TO DATA, SAMPLES AND RESEARCH RESULTS**

**9.1. Expected dates of submission to ..... of preliminary reports which should include the expected dates of submission of the final results :**

**Annual report of results in 2007**

**9.2. Proposed means for access by ..... to data and samples :**

International publications in the field of behaviour and neurosciences.

**9.3. Proposed means of making research internationally available :**

International publications in the field of behaviour and neurosciences.

# ANNEX

## List of the scientific team

### E.A. 3211 : "Physiologie du Comportement des Céphalopodes".

#### Enseignants chercheurs :

- R. Chichery, Professeur, Directeur.
- M.P. Chichery, Professeur
- C. Bellanger, Maître de Conférences
- L. Dickel, Maître de Conférences
- V. Agin, Maître de Conférences.

#### Personnels IATOS :

- C. Nougarède, Technicienne
- C. Marais, Adjoint Technique
- Nadège Naud, Adjoint Technique
- Ginette Lopez, Adjoint Technique

#### Doctorants :

- C. Alves, 2ème année de thèse
- N. Graindorge, 2ème année de thèse
- I. Bardou : 1<sup>ère</sup> année de thèse