

Report of the planning meeting for the 2006/07 IWC/SOWER cruise and future cruises

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1. OPENING REMARKS AND WELCOMING ADDRESS

The meeting was held at the Tokyo University of Fisheries and Technology, 27-29 September 2006. The convenor, Kato, welcomed the participants.

On behalf of the Japanese Government, Hyugaji welcomed all participants, including visitors from overseas. The SOWER cruises and their predecessors under IDCR had made a great contribution to the management of marine resources and that had been recognised internationally. The Japanese Government was proud to have been involved in the programme, and wished to record its thanks to all those who had made it possible, including past and present members of the Planning Committee, crew members, participating scientists, data processors and analysts. He looked forward to constructive discussions and wished everyone well in their deliberations.

Meeting participants are listed in Annex A.

2. APPOINTMENT OF CHAIRMAN AND RAPORTEURS

Kato was elected chairman.

Bannister and Ensor acted as rapporteurs, with assistance from Bravington and others where appropriate. Donovan carried out final editing.

3. ADOPTION OF AGENDA

The agreed agenda is given as Annex B.

4. ORGANISATION OF THE MEETING

It was **agreed** that as last year, the first two days, 27 and 28 September, would be devoted to discussion of the 2006/7 cruise (Part A of this report) whilst options for the future SOWER programme, i.e. beyond 2007, would be discussed on the third day, 29 September (Part B of this report).

5. REVIEW OF AVAILABLE DOCUMENTS

A list of documents available appears as Annex C.

A. The 2006/07 Cruise

6. REVIEW OF PLANNING DISCUSSIONS FOR THE 2006/07 CRUISE AT IWC58

The meeting reviewed the Scientific Committee's discussions at its St Kitts meeting (IWC/58/Rep1), in particular Item 10.6.2.1, Recommendations for the 2006/7 Cruise. It **agreed** that there were three particular elements for discussion at this meeting:

- (1) the utility of Adaptive Line Transect Sampling;
- (2) evaluation of BT (Buckland-Turnock) mode, involving the use of 'Big Eye' binoculars;
- (3) the extent to which low CVs could be obtained for any abundance estimates given the availability of only one vessel.

Element 3 is more relevant to long-term planning considerations and is discussed in Part B of this report. Element 1 was potentially relevant to both the present cruise and future cruises. The experience last year in the fin whale segment of the cruise had shown that the method could successfully be applied on the vessel but there has not yet been time to fully analyse the results from last year and it was **agreed** that it would not be a priority item for this year's cruise (and see Item 9.4).

7. AVAILABILITY OF RESEARCH VESSELS

7.1 Research vessels offered by Japan

Hyugaji confirmed that as last year, continuing financial constraints meant that only one vessel could be provided this year. The situation was unlikely to change in the foreseeable future, i.e. the assumption should continue to be made that only one vessel would be provided in future.

On behalf of the IWC, Donovan thanked the Japanese Government for continuing to provide at least one vessel. He noted that last year's planning meeting had also strongly recommended that other governments should consider providing vessels/ship time, but there had been no offers for the 2006/07 season (see also Part B, Item 3).

7.2 Other possibilities

Donovan stressed the importance of continuing to seek collaboration with other groups, such as CCAMLR, and reported that investigations were ongoing in respect of the 2007 International Polar Year (IPY; see also Part B, Item 3).

8. PRINCIPAL STRATEGY IN THE LIGHT OF ONLY ONE VESSEL BEING AVAILABLE

The meeting **agreed** that this matter had been considered in depth at last year's meeting and those discussions would be taken into account under Item 11.1 this year.

9. PRIORITIES FOR THE CRUISE

Given the discussions under Item 6 above, the meeting **agreed** that highest priority should be given to fully evaluating BT mode. It was **agreed** that a small subgroup under Bravington should undertake an in-depth consideration of the potential priority items discussed at the St Kitts meeting (SC58/Rep1, Annex G, p3 and Appendix 2). The report of that sub-group was accepted by the full group and is incorporated into this report under Items 9 and 11.

9.1 BT Mode

The BT approach is a way of designing and analysing distance-sampling surveys that allows a simple estimate of $g(0)$. It is also robust to certain types of responsive movement. The Scientific Committee has noted the potential value of BT mode for SOWER and has discussed various experiments that would be useful. This year, the Committee had agreed that further BT mode experiments should have high priority for the 2006/7 cruise; to finalise the analysis of existing minke whale data, it is important to complete these experiments as soon as possible.

BT mode experiments in SOWER have two separate purposes. First, they can help with estimating abundance from the existing SOWER data, and provide an independent check on estimates made by other methods which have to make extra assumptions. Second, BT mode provides a possible approach to future SOWER cruises which could allow simpler and more robust analysis methods to be used in future.

9.1.1 Continuation of the 2005/6 BT mode experiment

SOWER/06/WP15 reported preliminary analyses of the data from last year's BT mode experiment, using 'Big Eye' binoculars as the tracking platform in the upper bridge, no IO observers, and with the topmen using 7x50 binoculars as normal in Passing Mode. There is considerable overlap between the fields of view from the 'Big Eyes' and the topmen (and the other observers in the upper bridge), which is a significant complication in analysis. Nevertheless, the BT mode data gave substantially different estimates of $g(0)$ than preliminary estimates from standard IO mode data, showing the utility of the data. However, the sample size was rather limited, and true school size was not known because sightings were not closed on. This means that the $g(0)$ estimates cannot be stratified by school size, which creates difficulties for interpreting existing SOWER data.

A number of practical problems were encountered with the 'Big Eye' setup last year, and new equipment (kindly donated by Debbie Palka of the Northeast Fisheries Science Center, USA) is being fitted for this year's cruise. In particular, the new setup will use more robust binoculars, improved mounting and better wind protection. Apart from making it easier to use the 'Big Eyes' in good conditions, the new setup may make it feasible to use 'Big Eyes' in rougher conditions than last year. This would be very useful since a considerable part of the existing SOWER data has been collected in rougher conditions, and it is important to get $g(0)$ estimates appropriate to those conditions.

Following the Committee's recommendations, the Meeting **agreed** to repeat a slightly-modified BT experiment this year, in order to increase the sample size. To obtain data on true school size, the protocol should change to include closing-when-abeam on sightings made first with the 'Big Eyes'. Although some minor difficulties were encountered with last year's protocols, the experiment was largely successful and the protocols from last year should otherwise remain unchanged.

The meeting also received SOWER/06/WP22 and WP23, which included an update to WP15 and comments on it. Although there was insufficient time to consider the matters raised in detail, it was agreed that there seems no reason to change any of this year's planned BT experiments. However, there is a need in future to obtain more accurate distance and angle measurements, and use of new equipment (kindly lent by Phil Hammond of the Sea Mammal Research Unit, UK), at least for the 'Big Eye' component, should achieve that this year. In that context it was **agreed** that some further analysis, particularly on estimated swimming speeds, would be valuable, and a small group (Hedley, Bravington) was formed to pass on specific suggestions to Burt.

9.1.2 Alternative BT mode, for possible use in future cruises

There are two main difficulties in using 'Big Eyes' on SOWER surveys: significant overlap in field of view with topmen who use 7x50 binoculars; and problems with ease-of-use when weather conditions are less than perfect, which significantly restricts available survey time. Although the improved equipment proposed for this year's cruise may help somewhat, it may never be realistic to rely on 'Big Eyes' as the main tool for SOWER surveys in future. It is therefore important to consider other versions of BT mode that do not use 'Big Eyes'. For this year's survey, it was **agreed** to trial the following version:

- the 'primary platform' consists of two observers in the IOP searching with naked eye (one-way communication to upper bridge);
- the 'secondary tracking platform' consists of the topmen searching as normal with 7x50s, but tracking their sightings until the sighting is abeam (two-way communication with upper bridge);
- the upper bridge acts as an additional tracking and duplicate-ID platform.

This version of BT mode was briefly tried in 2004/5 but no conclusions could be drawn from the limited data obtained then. The protocol for 2004/5 can be used again this year, with minor modifications.

There are two major potential advantages to this approach. First, the fields of view should not overlap much between the primary and tracking platforms, so that a simple and robust method can be used to estimate $g(0)$. Second, the tracking platforms will continue to operate with familiar equipment of high efficiency. The potential disadvantage compared to existing SOWER protocols is that fewer sightings will be made, because the IO observers are not using binoculars. To test the utility of the method, it is therefore necessary to collect enough sightings to estimate the ratio of IOP-sightings to TOP-barrel-sightings in the proposed method, which will be compared with the ratio in existing SOWER data. The ratio does not need to be very precisely estimated, and it should be possible to collect enough data in two survey days in an area of fairly high minke whale abundance, preferably in poor weather as well as in good weather. There is no need to use a closing-when-abeam protocol during this experiment.

It was **agreed** that BT mode experiments should continue to have High Priority.

9.2 School size estimation

One of the main complications in analysing existing SOWER minke whales data is that school size estimates in IO mode are likely to underestimate true school size. At the St Kitts meeting, the Scientific Committee gave high priority to an experiment to study the difference between IO-mode and closing-mode estimates of school size. The meeting **agreed** to include such an experiment in this year's cruise. The basic idea is to follow normal IO-mode sighting and tracking protocols (including school size estimation) until a sighting is judged likely to be abeam of the vessel, and then to attempt closing on the sighting to check the actual school size.

This experiment is similar to the 'SSII' experiment conducted in the 1984/5 and 1985/6 cruises, except that the original experiment used Passing Mode while the new experiment would use IO mode. It is important to collect more data for two reasons: first, to allow calibration of school size estimates for sightings made from the IO-barrel, and second because there have been considerable changes in experience with the SOWER protocols in the twenty years since the original experiment. The sample size required to get a precise estimate of the proportion of schools is quite large, of the order of 100 sightings.

The protocols for this experiment are basically similar to normal IO mode, but some extra details need to be decided. A small group (Ensor, Matsuoka, Hedley, Donovan) was appointed to develop a detailed protocol based on the existing SSII, and the full protocols will be included in the 'Guide for Researchers'.

It was **agreed** that school size experiments should continue to have High priority.

9.3 Visual dive time

The data from the visual dive time experiments in 2004/5 have already proved useful in guiding the simulation tests of abundance estimation methods. Most of the data were collected under good conditions and it would be useful to have more data from poorer conditions.

It was **agreed** that visual dive time studies should have Medium priority for the 2006/7 cruise, concentrating on poorer conditions.

9.4 Fin whale abundance estimation

In 2005, the Scientific Committee gave high priority to collection of any further experimental data needed to assess the feasibility of a full-scale fin whale abundance estimate. However, the results of the 2005/6 survey suggest that no further experiments are needed this year. The main potential difficulty concerns how to survey

and analyse large diffuse aggregations of fin whales. It was **agreed** that passing-mode methods used for large diffuse aggregations of other species, such as pilot whales (e.g. NAMMCO, 1995), should be successful with fin whales, and that there was no need to collect further experimental data on fin whale abundance this year.

The experimental use of ALTS (adaptive line transect sampling) during the 2005/6 cruise showed that there were no serious logistical problems in implementing ALTS, and it was therefore **agreed** that no further ALTS experiment was required for 2006/7.

9.5 Biopsy sampling/photo id

The meeting welcomed a progress report on cataloguing of blue whale photo-ID sightings from the 2005/6 cruise (SOWER/06/WP16). This is the first stage in examining all blue whale photographs from IDCR/SOWER cruises from 1987/88 to the present. A database of photo-IDs for blue whales and humpback whales in the Antarctic is under development and Donovan will liaise with Olson on this. The Meeting also welcomed progress in inventorying biopsy data, and **encouraged** mark-recapture analyses of both photo-ID and genetic-ID data.

It was **agreed** that biopsies and photo-ID should remain as High priority for the 2006/7 cruise and to this end it was also **agreed** to purchase an additional digital camera.

9.6 Satellite tagging

No suitable system for long-term tag deployment is available for the 2006/7 cruise, so there will be no satellite tagging this year. However it remains a high priority item for the future, when fully-tested equipment that is usable in SOWER becomes available (SOWER cruises are not an appropriate developmental platform); this is discussed more thoroughly under Part B, including a proposal by Kleivane (WP10).

9.7 Acoustic studies

The Scientific Committee has noted that acoustic data have potential value in improving the precision of abundance estimates for SOWER. The sonobuoy trials in the fin whale sector of the 2005/6 cruise showed that although the equipment worked well, there were very few fin whale vocalizations. Acoustics therefore are unlikely to be useful for fin whales in SOWER, but blue and humpback whales vocalize much more and acoustics are of much greater potential value for these species. In the Antarctic, humpback whales are sufficiently abundant and conspicuous that conventional visual line transect surveys will be practical. The scarcity of blue whales creates problems for traditional line transect abundance estimation, and acoustic data could be particularly useful not only for potentially distinguishing 'true' from pygmy blue whales, but also in locating blue whales for photo-ID and biopsy sampling (and hence using mark-recapture approaches). This would require acoustic equipment capable of direction-finding, together with a specialist skilled operator. For the present cruise, It was **agreed** to continue opportunistic but high-priority deployments of sonobuoys in the blue whale research areas this year but to leave more specialist approaches to future years. Fewer sonobuoys would be needed than in 2005/6 (see below).

9.8 Direct data entry; reducing errors in distance/angle estimation

Preliminary results from analyses of the 2005/6 BT mode data suggest considerable variability in SOWER distance estimates. Such variability can cause substantial problems for abundance estimation, and the Committee has recommended that ways to reduce the errors be investigated for SOWER. The SCANS II survey in 2006 used an automated distance- and angle-measuring system for the Big Eye observers, and it was **agreed** that use of this system (kindly provided by SMRU, see above) should be a high priority for the 2006/7 SOWER cruise. Training is required, and Donovan will investigate how this can best be achieved, in conjunction with Hammond and Leaper.

The SCANS II distance-and-angle system is also relevant to the issue of direct data entry. The 2005/6 cruise encountered major problems in using WinCruz software, particularly in high-density areas, but the modified version of the Logger software used in SCANS II should be easier to operate and less problematic. Donovan will liaise with Hammond and Leaper on this matter.

10. REVIEW OF THE BUDGET

Donovan reported that the original proposal totalling just over £86,000 (SOWER/06/WP3 Adjunct 2) had been reduced by the Scientific Committee, in line with other necessary reductions, to £76,000 for recommendation to the Commission; that amount had been approved. Subsequently however, the final accounts from the previous cruise showed savings had been made that will allow the necessary expenditure for the present cruise.

11. CRUISE PLAN

11.1 General priorities, including allocation of research effort

The meeting reviewed the general priorities for the cruise in light of the priority items developed at St Kitts and as discussed under Item 9.

The total time available to the cruise is 65 days of which 48 days will be in the research area (see Fig. 1).

Given the discussions under Item 9, and the total time available for the cruise, it was **agreed** that obtaining an abundance estimate for fin whales this year was not sensible. To obtain an estimate for a reasonably-sized area would require all of the time available. Given the pressing need for the Committee to agree abundance estimates for Antarctic minke whales, it was therefore agreed that priority should be given this year to obtaining data to resolve existing problems related to the minke whale assessments, with most of the time being allocated to this work in the southern research area. Consideration should be given in a future year to dedicating a cruise to obtaining fin whale abundance for an appropriate area (taking stock structure information into account). Some priority and time should also be allocated to biopsy sampling (of fin and humpback whales) and photo-identification (of humpback whales) in the northern stratum; at least the same amount of time as last year should be dedicated to blue whale research (given the possibility of obtaining a mark-recapture estimate as well as information on site fidelity) in the southern area.

Discussion first centred on the amount of time likely to be required to obtain sufficient sample sizes for the necessary minke whale experiments, given the three elements involved - school size estimation (SSIII); BT (and alternative); and dive time experiments.

Given last year's sighting rates in Passing Mode (300 in 22 twelve hour days, ie approximately 1 per hour) and adding 30 minutes for the effectively 'Closing Mode' operations necessary for the BT (Big Eye) and SSIII experiments, the *ca* 100 necessary sightings for the SSIII experiments could be obtained in 10-12 days.

Although some BT effort can be carried out in Passing Mode, some will be needed in Closing Mode Abeam, to obtain estimates of school size. It is not easy to calculate the necessary school size for obtaining a value for $g(0)$, but previous proposals (e.g. in planning a strategy for the possible closure of the Ross Sea) had allowed for *ca* 20 duplicate sightings to estimate a $g(0)$ factor (integrated over sighting conditions and school sizes). However, for obtaining estimates of $g(0)$ for the existing IDCR/SOWER minke whale data, it is useful to obtain $g(0)$ estimates for different school sizes in a range of sightability conditions for which at least 40 duplicate sightings are required - similar to the number (38) obtained in 2005/6. Allowing for the need to operate partly in Closing Mode Abeam, it was agreed that a little more time would be needed than last year i.e. 21 days. An additional 2 days are required to obtain the 20 sightings necessary for BT option 2 experiments. Despite the improved equipment and mounting, it is anticipated that 'Big Eye' BT will only be able to be undertaken in relatively good conditions (good minke whale visibility and wind speeds of up to about 15 knots) – thus a portion of the 21 days would be suitable for general minke whale survey but not 'Big Eye' BT; some of this time can be used for completing the minke whale dive time experiments (which require data from poor weather conditions as well as more trials for school size one).

The meeting **agreed** that the total time required for minke whale experiments, all in the southern stratum, would then be $12 + 21 + 2$, i.e. 35 days. Allowing for six days for blue whale research (two being added to allow for the possibility of blue whales being encountered in the northern stratum) would then leave $48 - (35 + 6) = 7$ days for fin whale research in the northern stratum.

11.2 Itinerary

The following itinerary was confirmed:

DATE	EVENT
17 November 2006	Depart Shioyama, Japan
18 December 2006	Arrive Cape Town, South Africa
21 December 2006	Depart Cape Town
27 December 2006	Arrive northern research area
2 January 2007	Transit to southern research area
4 January 2007	Arrive southern research area
14 February 2007	Complete research and commence transit to Cape Town
23 February 2007	Arrive Cape Town
26 February 2007	Depart Cape Town
30 March 2007	Arrive Shioyama, Japan

Following discussion under Item 11.1, the 48 days in the research area were allocated as follows:

- 7 days in the northern stratum, mainly allocated to fin whale research
- 41 days in the southern stratum, comprising
 - 12 days for minke whale SSIII experiments
 - 21 days for minke whale BT mode experiments
 - 2 days for minke whale dive time experiments
 - 6 days for blue whale research

The meeting noted that some flexibility may be achieved by including dive time experiments during relatively poor weather periods within the 12 + 21 days allocated for the minke whale SSIII/BT mode experiments.

In addition, at the discretion of the Cruise Leader, biopsy sampling and photo-identification may be undertaken on other species (see Item 12.2.3).

11.3 Survey area

As proposed at the St Kitts meeting, it was **agreed** that the area should be the same as last year, i.e. Area III, but with the starting point at 0° longitude, so as to include the western part not covered last year. From there, the cruise track, through the northern stratum, will be approximately south east towards 61°S. As last year, permits will be needed to enter the Norwegian EEZ around Bouvet Island and to undertake biopsy sampling there. There will not be sufficient time available to include any part of Area II. Research in the southern stratum will be mainly along the ice edge between 0° and 20°E.

11.4 Research vessel

As noted above, it was confirmed that the research vessel *Shonan Maru No.2* will be provided by the Japanese Government for the 2006/07 cruise.

12. DETAILS OF THE CRUISE

12.1 Standard sightings

12.1.1. Cruise track design and Itinerary

The cruise track design during the minke whale research component will be completely flexible as during the 2005/6 cruise. The minke whale (and blue whale) related research is most likely to be conducted in the vicinity of the ice edge where the sighting rate for minke whales is expected to be higher. The strategy of a completely flexible trackline has again been adopted for this cruise because the priority of the minke research is to test the BT approach and try to obtain a good estimate of $g(0)$. The aim is thus to maximise the number of potential binary trials during BT mode and the sample size for the SSIII experiment, and re-surveying areas of higher sighting rate is one acceptable approach to achieve this.

An interim cruisetrack design for the fin whale survey was established as a survey leg joining positions 55°S 000°, 61°S 005°E (Fig. 1). This design may be modified during the cruise based on the observed distribution of fin whale sightings and weather conditions etc.

12.1.2 Survey mode and research hours

FIN WHALE RESEARCH

The fin whale feasibility survey will be conducted in Closing Mode (NSC) and normally closure will only be completed to large baleen whales that it is believed may be fin or humpback whales (the priority species expected in this area). In this regard, the 'Big Eyes' (on board for BT mode) may be a useful aid for species identification.

MINKE WHALE RESEARCH

The minke whale research component will primarily involve survey in 'Big Eye' BT mode and SSIII experiments. The SSIII experiments will be based on IO mode and the duties of the TOP and IOP observers will be essentially the same as for normal IO mode. Therefore, with respect to the amount of time for continuous survey in this mode, normal IO mode guidelines will apply (i.e. no more than 100 n.miles surveyed continuously). To meet this requirement, alternation of the SS-III trials with other research activities (mainly with the other priority item, 'Big Eye' BT mode survey) will be made. 'Big Eye' BT survey will be conducted in NSP mode (as for most of the trials last year). In addition, blue whale research, humpback whale biopsy sampling, minke whale dive time experiments and BT option-II trials will be interspersed between the SSIII and 'Big Eye' BT mode trials.

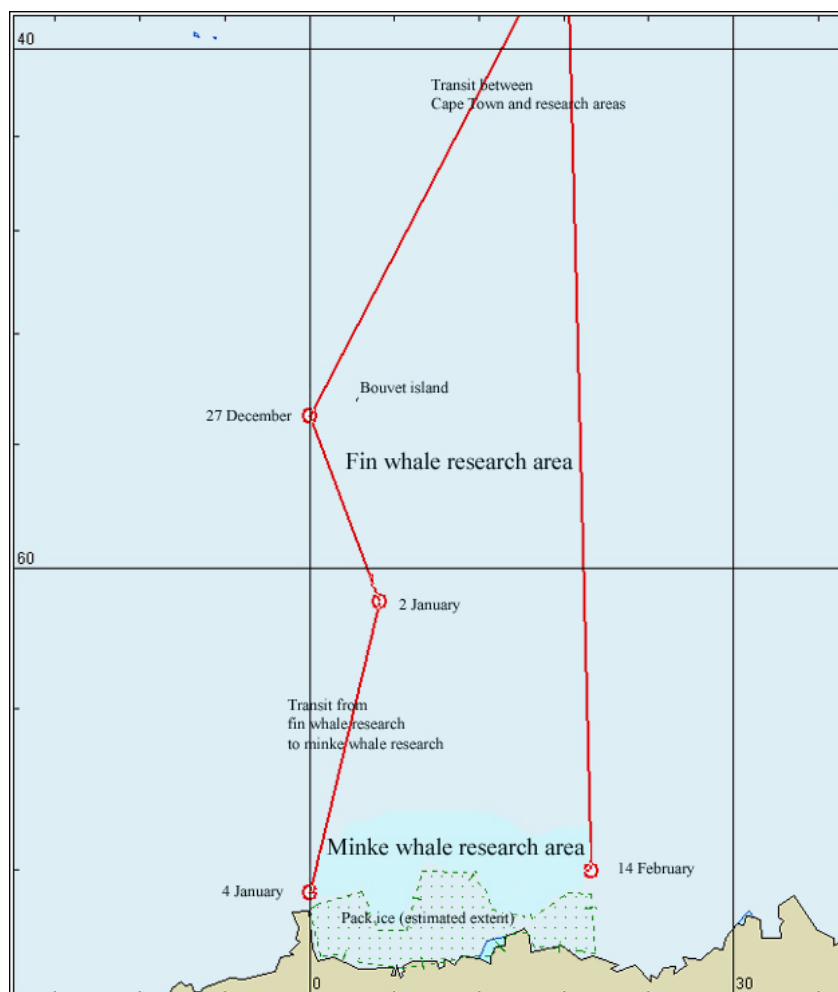


Fig.1. Example cruisetrack for the cruise and suggested southern research area. A provisional transect is shown in the fin whale research area. No transects are indicated in the minke whale research area since the cruisetrack design will be completely flexible. The provisional schedule is indicated by the dates.

RESEARCH HOURS

Research hours during the cruise will be the same as on recent SOWER cruises. During days when survey is conducted in IO mode (including SSIII and BT-option II), research will be scheduled between 0600-1900 hours and there will be provision for two meal breaks each of 30 minutes duration. When, due to conditions unacceptable for the sightings survey, the vessel is waiting on an IO mode segment of the trackline, meal breaks will be treated in the same manner as if the vessel is surveying.

When surveying in NSC or NSP (passing) modes (including 'Big Eye' BT) is the only activity of the day, research will be conducted between 0600-1800 hours.

For priority species (such as blue whales), it may be beneficial to extend research outside the normal research hours as during the 2005/6 cruise. The basis for such special extension of research hours will involve mutual agreement between the Captain and Cruise Leader and, as during the last cruise, an allocation of equivalent time-off the following morning or evening.

Limited night steaming may be conducted. Night steaming will be restricted to a maximum of 30 n.miles per day and should always be completed prior to midnight.

The research day in transits will begin 30 minutes after sunrise and end 30 minutes before sunset, with a maximum of a 12-hour research day.

If necessary, time-zone changes will be in 30-minute intervals, coming into effect at midnight.

12.1.3 Number of crew on effort

Two crew members will be in the barrel whenever full searching effort is conducted. One crew member will be in the Independent Observer platform whenever the IO mode is conducted. One crew member will be at the helm

on the Upper Bridge, regardless of the research mode. Also present on the Upper Bridge, whenever the sighting survey is conducted, will normally be the captain and chief engineer (or an alternate).

This is the same number of observers per platform as on previous cruises and again, in the interests of standardised data collection, the number of observers on the Upper Bridge is to be limited as above. As last year, observers should not search from the Upper Bridge during their scheduled rest periods. They may visit the Upper Bridge on a casual basis during their rest periods, but must not inform the on-effort observers of any sightings they may make, until such sightings have passed abeam, unseen by any of the on-effort observers.

There will be four researchers on the vessel. During the SS-III experiment, the number of researchers searching from the Upper Bridge should be standardised at three. During the fin whale component and the minke whale research component when 'Big Eye' BT trials are conducted, there may be four researchers on the Upper Bridge. The 'Big Eyes' will be primarily operated by researchers on a rotational basis.

During the BT option-II trials, unlike during normal IO mode, there should be two observers in the IOP, one crew observer and one researcher. (In normal IO mode there is only a solitary observer in the IOP, since normally the number of available observers is insufficient for the rotation of two observers through this platform).

12.1.4 Navigation and research speeds

Research during transit will be conducted at an average speed of 11.5 knots.

In general, surveying in the research area will be conducted at an average speed of 11.5 knots although in NSC mode, the vessel will usually close to sightings at 15.0 knots.

12.1.5 Acceptable conditions

Search effort for minke whales will be conducted only when the Cruise Leader believes that sighting conditions are acceptable. The usual Guidelines for acceptable conditions apply, i.e. visibility (to see a minke whale) is greater than 1.5 n.miles and wind speed is <25 knots (in the vicinity of the ice-edge) and <20 knots (remote from the ice-edge); the sea state should be <Beaufort 6.

For the fin whale research, the decision that conditions are acceptable is again the responsibility of the Cruise Leader: guideline acceptable conditions for survey are that the wind speed is <25 knots and sea state <Beaufort 6. This is the same as for blue whale search mode - BB mode.

12.1.6 Estimated Angle and Distance training and Experiment

Although it was recognised that alternative methods of assessing error and bias in estimated angles and distances may be available for this cruise (for example the SCANSII equipment), it was **agreed** that the normal estimated distance and angle training exercise and experiment is essential. This experiment is designed to calibrate and identify any biases in individual observers' estimation of angle and distance.

A training exercise may be conducted near the beginning of the fin whale component otherwise on a priority basis near the beginning of the minke whale component to familiarise the observers with distances, angles, and the use of reticle binoculars and angle boards. The exercise uses the estimated distance and angle experiment procedures, except that several observers can make estimates at one time, and the observers are informed of the radar values in each trial. The exercise should be done with the ship underway. The number of trials conducted is at the discretion of the Cruise Leader.

The experiment will again be conducted this year during the minke whale component following the same procedure as on recent cruises.

Table 1

The Cruise Leader should select, at random, distances from six of the following seven ranges:	Similarly the angles should be selected, at random, from six of the following seven trials:
(n.mile)	(degrees)
0.00 - 0.25	00 - 10 two trials
0.26 - 0.50	11 - 20 two trials
0.51 - 1.00	21 - 40 two trials
1.01 - 1.50	41 - 60 one trial
1.51 - 2.00	
2.01 - 2.50	
2.51 - 3.00	

A large buoy with a radar transponder is used as the sighting target. At pre-determined distances and angles from the buoy (Table 1), visual observations by the observers are taken simultaneously with radar readings. Six trials

per observer, per sighting platform, are scheduled. Primary observers should be tested from platforms where they normally conduct sighting effort and should use the same procedures and equipment as in their normal sighting procedures. The experiment should be conducted during weather and sea conditions representative of the conditions encountered during the survey. It was agreed that the training exercise and experiment should also be undertaken using the high-powered binoculars to be used for BT mode.

12.1.6 BT mode

BT mode trials will constitute a major part of the research during the minke whale research component of this cruise.

As noted earlier, the BT experiments contribute to the SOWER programme in two different ways:

- (1) with interpretation of abundance estimates from previous cruises (by providing independent evidence on $g(0)$ robust to data and to difficulties such as responsive movement);
- (2) in designing and evaluating possible future survey methods.

BT mode trials scheduled for this cruise will focus primarily on continuing the 'Big Eye' BT trials (with some modifications) to focus on point (1) above; however additional trials to assess point (2) above will also be conducted – see below).

The two options are:

- (1) 'Big Eye' protocol;
- (2) option-II from the 2004/05 cruise.

'BIG EYE' BT

The proposed method for 'Big Eye' BT will use mounted 25× binoculars on the Upper Bridge. Survey will be conducted in NSP mode (as was most of the 'Big Eye' BT survey on last year's cruise). A modification to the procedure used last year will be that closure to all minke whale sightings initially detected by the 'Big Eyes' will be attempted after tracking and when the sightings are judged to be abeam of the vessel. The purpose is to obtain accurate school size information.

It was noted that Palka (from the NEFSC) has generously agreed to loan one set of 'Big Eye' binoculars and a matching stand for this research. The 'Big Eye' binoculars have reticules installed and the stand has a built-in azimuth ring for angle measurement. It has been arranged for the binoculars and base to arrive in Japan as requested during the Planning Meeting, and as they are different (and an improvement) from those used last year, it was **agreed** that, Ensor and Matsuoka should travel to the ship in Shiogama immediately after the meeting to develop plans for installation and for potential modifications to enhance wind protection. The actual installation will be undertaken at a later date during annual dock maintenance prior to departure of the vessel from Japan. Furthermore, it was noted that in late October the vessel would be conducting a sea trial following its annual dock repair work and this would provide an opportunity for the ship personnel to test the effectiveness of the mounting.

BT OPTION-II

Trials of BT option-II (as originally developed as a contingency for the 2003/4 cruise) will be conducted on this cruise in accordance with the recommendation of the Scientific Committee to examine potential methods for future survey.

Details of the protocol for BT option II trials have been modified from the 2004/5 cruise and are documented in the Instructions for Researchers.

12.1.7 School size estimation

It was **agreed** that a school size estimation experiment (SSIII) to investigate the important question of the difference between confirmed school sizes of minke whales (mainly obtained during Closing Mode) and unconfirmed school sizes (mainly obtained during Passing Mode) will be undertaken during this cruise. Although the basic protocol of the experiment will be the same as the SSII experiment conducted during 1984/85. The primary differences will be that:

- (1) the experiment will be conducted in IO mode (instead of NSP mode); and
- (2) abeam closure will be attempted on all minke whale sightings (instead of randomly selected sightings).

The protocol for the SSIII trials is documented in Instructions for Researchers.

12.1.8 Visual Dive Time

The purpose of this activity is to collect data on the surfacing rate of minke whales for use in estimation of $g(0)$ and to assist in developing realistic simulated datasets. Whilst VHF telemetry provides biological surfacing rate data for individual animals, visual recordings are useful since they provide data on cue availability in different weather conditions and for different school sizes, as well as on school synchrony and dive behaviour.

The dive time experiment will be conducted during the minke whale research component. Dive time data collected on the 2004/5 cruise were restricted to observations in good conditions only (mainly sea states 0, 1 and 2 on the Beaufort scale). It was therefore **agreed** that the emphasis during this cruise should be on conducting trials on a range of group sizes in poorer conditions, within the standardised range of acceptable searching conditions (sea states 3 and 4). Also, as there were few successful trials on solitary animals during the 2004/5 cruise, trials under the full range of weather conditions acceptable for survey will be attempted for such groups.

The protocol for the visual dive time experiment will be unchanged from last year.

12.1.6 Data format

The survey will be conducted using essentially the same data forms as on the last cruise. Minor modifications to the sightings data form including additional mode categories for the BT and SS-III trials and the development of additional effort codes was proposed. In addition it was proposed that for blue whales a 'condition index' be recorded. It was noted that a digital database for recording and cross-referencing photo-ID and biopsy data was currently under development by the IWC Secretariat and this would be ready in time for use during the cruise.

Donovan and Ensor will provide to ICR the Data Records and Usage notes as soon as possible.

12.1.7 Computer Data Entry

It was **agreed** that further trials with direct data entry will be continued on this cruise. The 2005/6 cruise encountered major problems in using *WinCruz* software, particularly in high-density areas, but the modified version of the *Logger* software used in SCANS II should be easier to operate and less problematic. Donovan will liaise with Hammond and Leaper on this matter.

In the absence of a customised direct data entry system, it was **agreed** that input of effort, weather and sightings data would be completed using the Moon Joyce program. It was noted that this would greatly assist the preparation of a validated data set by the IWC Secretariat for distribution to facilitate some analysis prior to the 2007 Annual Meeting.

12.2 Other experiments

12.2.1 Biopsy sampling and photo-identification

Specific research time has been allocated to research on blue and fin whales, to include biopsy sampling and photo-identification. As appropriate and decided by the Cruise Leader, time will also be allocated for biopsy and photo-identification of humpback and right whales.

As last year, the importance of collecting samples from humpback whales (particularly from west of the longitude of South Africa) was noted. There is considerable uncertainty concerning these stocks and the pattern of their migration.

Opportunities should be taken for collection of biopsy samples from sperm and killer whales and other 'incidental' species during the normal process of confirming species identification and numbers, or if animals approach the vessel while off-effort.

There had been a request from researchers at Southwest Fisheries Science Center, La Jolla for a change to the preservation method for the IWC part of the biopsy samples. Previously the IWC part of the sample had been separated from the blubber and preserved in DMSO. The new preservation method would involve freezing and/or preserving in ethanol and precise instructions will be provided later.

Photo-identification studies should be conducted at the same time as the biopsy sampling. Priority species are blue, humpback and right whales, in that order of priority.

Photographs of killer whales can also be taken on an opportunistic basis. Their purpose is not primarily for use in photo-identification studies but as an aid for the development of a visual recognition key for the three killer whale forms known to occur in the Antarctic. It is important to take photographs of animals from which biopsy samples are obtained, to determine their type.

An additional new digital camera will be available for this cruise – Donovan and Olson will ensure that the camera is available. Photographs will become the sole property of the IWC. Dedicated camera equipment will be supplied. (Researchers must use their own film and camera equipment for private photography).

Release of photo-identification photographs will be under the standard IWC Guidelines.

12.2.2 Videotaping

Where biopsy and photo-identification studies of blue whales are attempted video filming should also be conducted using the same procedures as in recent blue whale research.

12.2.3 Oceanographic survey

No oceanographic sampling will be undertaken, as on last year's cruise.

As last year, a request was made for deployment of three floats under the *Argo* oceanographic programme, outside the South African EEZ. Deployment at the target latitudes would be made during the transit to (or from) the Antarctic. The floats will be placed on board in Japan.

The meeting **agreed** to cooperate with this internationally important programme, the results of which will become publicly available in due course.

12.2.4 Acoustics

As discussed under Item 9.7, the main focus of the acoustics research during this cruise will be opportunistic during the blue whale research component. As there will be no dedicated acoustics researcher on the cruise, acoustics recording will not be conducted on a routine basis and will generally be conducted only in the presence of blue whale sightings.

The meeting welcomed the comments from the Chief Operator on the vessel (Y. Tsuda) that he would be willing to assist with the recording of these data. Details of the equipment, software and protocols to be implemented will be provided later following consultation between Clark, Donovan, Ensor and others. The equipment to be used will include the sonobuoys already available.

13. INTERNATIONAL RESEARCHERS AND ALLOCATION OF RESEARCH PERSONNEL

13.1 Number of researchers

The single vessel available this year can accommodate four researchers.

13.2. Nomination and allocation of researchers

A subgroup under Bannister (Bravington, Brownell, Donovan, Ensor, Hedley, Kato) reviewed possible candidates on the basis of their experience and expertise.

This year, given the priority given to completion of minke whale experiments, preference was given to those with proven expertise in use of 'Big Eye' binoculars, and in BT or similar mode surveys such as the recent SCANS II survey. Previous experience on IDCR/SOWER cruises, as well as on other sightings surveys and in acoustics were also an advantage. From the 12 applicants the subgroup recommended appointments as below:

SM2
Ensor (New Zealand) - Cruise Leader Fukutone (Japan) Olson (USA) ('Big Eye', previous SOWER and NOAA surveys, acoustics) Beasley (New Zealand) ('Big Eye', NOAA surveys, acoustics)
Reserves – Servido (Italy) ('Big Eye', SCANS, acoustics); Janowski (Canada) ('Big Eye', acoustics)

The meeting accepted the recommendations. Donovan undertook to inform all applicants of the outcome immediately, asking the appointees to forward necessary personal details, including passport numbers, to Shimada as a matter of urgency. Dietary requirements are to be forwarded to Matsuoka. As in past years, letters of appointment will emphasise the need to follow the previously adopted technical and personal guidelines

14. GENERAL PREPARATIONS FOR THE 2006/7 CRUISE

14.1 Identification of home port organiser

Best had agreed to act as home port organiser in Cape Town, assisted by Findlay.

14.2 Entry and other permits

As last year, South African port access permits and EEZ Closing Mode permits will be sought by the Fisheries Agency of Japan. Permits from Norway for research (including biopsy) in the EEZ surrounding Bouvet Island

will also be sought. Hyugaji and Shimada agreed to be responsible from the Japanese side for undertaking these duties. Donovan undertook to arrange for the IWC to approach the South African and Norwegian Commissioners to IWC so they can seek cooperation with the requests. Copies of permits should also be sent from the Fisheries Agency of Japan to the IWC Secretariat.

14.3 Review of recommendations from the 2005-2006 cruise (SC/58/IA1, p22)

Acoustics

- (1) VHF radio DiFAR modification: although this had been agreed in St Kitts, there had so far been no action. Given the discussions at this meeting (see Item 9), there is no requirement to undertake the modifications for this year's cruise, but it would be useful to have them done in anticipation of their use in direction-finding of blue and other whales on future cruises.
- (2) Purchase of a dedicated acoustics computer and associated software: funds for the purchase are available in the budget.
- (3) Expediting biopsy sample processing/transport: Brownell reported that once received at the South West Fisheries Science Center laboratory (La Jolla), blue whale samples are given high priority for processing. (See item 16.2 for discussion of transport of samples to the laboratory)

Biopsy/photo-identification

- (1) New darts: Donovan reported that these are being shipped to Cape Town on or around 9 October.
- (2) Development of protocols for electronic data recording of biopsy samples and photographs: Donovan reported that this is in hand and the new protocols should be available for this year's cruise.
- (3) Additional computer/hard drive for storing digital images: funds for the purchase are available in the budget

Direct Data Acquisition

- (1) Implementation of a single data acquisition system: already in hand through provision of the Logger/SCANS II system (see Item 9)

BT mode

This item was covered comprehensively by the subgroup under Bravington (see Item 9)

15. IN TRANSIT SURVEY

15.1 Japan to Cape Town

As last year, in the absence of researchers, Closing Mode sightings operations will be conducted by the crew. Such surveys would only be conducted outside any EEZs intersected.

15.2 Cape Town to Research Area

Closing Mode will be adopted unless there are schedule problems, when Passing Mode will be substituted. Permits will be sought for survey in Closing Mode (but excluding biopsy sampling) in the South African EEZ. Outside the EEZ, biopsy sampling and photo-identification may be undertaken during the transit, but with low priority. Permits will be sought for survey in Closing Mode and for biopsy sampling in the Norwegian EEZ surrounding Bouvet Island.

15.3 Antarctic to Cape Town

Closing Mode will be adopted unless there are schedule problems, when Passing Mode will be substituted. Permits will be sought for survey in Closing Mode (but excluding biopsy sampling) in the South African EEZ.

Outside the EEZ, biopsy sampling and photo-identification may be undertaken during the transit, but with low priority.

15.4 Cape Town to Japan

See Item 15.1.

15.5 Necessary permits

There is no requirement for CITES permits until after the vessel's return to Japan (but see Item 16.2).

Individual researchers are responsible for obtaining any permits required from their home countries to take part in the cruise.

16. TRANSPORTATION OF DATA, SAMPLES AND EQUIPMENT

16.1 Details

The meeting reviewed an equipment list (SOWER/06/WP13) prepared by Matsuoka. As in past years, ICR and The Institute of Far Seas Fisheries will supply many of the essential items for the cruise.

Other equipment-related items addressed were:

- (1) Direct data entry system: Donovan is in touch with Hammond concerning provision of the SCANS system. The 'Miyashita' system will be available as back-up.
- (2) Biopsy sampling: 200 sample tubes will be provided. Brownell had contacted LeDuc to discover current preservation requirements, including the need for frozen specimens (see Item 12.2.3).
- (3) Acoustics system software: Donovan will consult with Clark.

16.2 Necessary permits

See Item 15.5. Under the same procedure as on previous cruises, no CITES permits would be required from Cape Town since samples, including blue whale and killer whale samples, would be retained on board for subsequent shipment from Japan to SWFC. Half samples would be retained in Japan; Shimada would be responsible for shipment.

CITES permits would be required for the onward shipment from Japan. Hyugaji reported that the Japanese Government would provide the necessary permits for import of specimens into Japan from the high seas.

Concerns were raised over the considerable delay in shipment to the La Jolla laboratory of specimens obtained on last year's cruise. Shimada reported that it seemed likely they would now be shipped towards the end of 2006.

There was considerable discussion of the seemingly intractable problem of this unacceptable delay, which had been a problem for many years. Elsewhere (e.g. in Australia and the USA), institutional permits were available; as a result it was possible to transfer biopsy samples from the Western Australian Museum to SWFC by airmail within a matter of days. Under the current Japanese system there were complicated and time-consuming bureaucratic procedures, including the need to photograph each specimen. In response to a proposal that the latter might be outsourced, Bannister proposed that if it were a necessary element of any permit procedure it should be done by the researchers on board the vessel. Brownell agreed and wished the meeting report to record that in his view outsourcing could introduce errors in associating the data with the specimens and was unacceptable. The meeting **strongly recommends** that every effort be made by the appropriate Japanese researchers and agencies to obtain an institutional permit.

Donovan undertook to raise with Best the possibility of transferring the specimens from the vessel in Cape Town under permit from the South African Government. The matter should be reviewed at the Pre-cruise Meeting.

16.3 Responsible persons

The meeting noted the following: in Cape Town – Best, assisted by Findlay; at sea – Cruise Leader.

The Cruise Leader and Japanese researcher will be responsible for data transport after the cruise.

17. COMMUNICATIONS

17.1 Safety aspects

Formats and schedules for communicating between the research vessel and JARPA (*Nisshin Maru*), and with the cruise organisers, are shown in Annex D.

17.2 Between Cruise Leader and IWC

The Cruise Leader will send a weekly progress report to the IWC Secretariat and to the Steering Group (Bannister, Best, Bravington, Brownell, Childerhouse, Clark, Donovan, Hedley, Kato, Palka). A report will also be sent after the completion of each phase of research as appropriate. Matsuoka will forward copies of those reports to The Institute of Cetacean Research, the Fisheries Agency of Japan and Kyodo Senpaku Co. Ltd.

17.3 Ice information

As last year, the cruise tracks near the ice edge will be flexible in design and ice information will not be as important as in previous cruises. However when required, SSM/I ice data, obtained by the radio operator from the internet, will be transformed using computer programs on board the vessel.

17.4 Other official communication

Email, telephone and facsimile will be available. The vessel's email address will be available at a later date.

All official communications by the Cruise Leader, relevant to the cruise, will be paid for by the IWC. Communications can be by radio, telephone, email, or fax.

17.5 Private communications

Researchers and crew may send and receive private communications, including email, at their own expense.

17.6 Terms of payment of communication cost

Accounts must be paid by researchers before leaving the vessel at Cape Town. Payment for email is required in US dollars. Payment for Inmarsat telephone/fax may be made by credit card. The researchers are requested to make payment if possible on the day prior to port entry.

18. MEETINGS

18.1 Pre-cruise Meeting

A pre-cruise meeting will be held in Cape Town on 19-20 December 2006 at a venue to be arranged by Best. Fukutone will undertake translation to and from Japanese at the meeting. The cost of hiring transport for the researchers and crew while in Cape Town (e.g. to attend the meetings) will be met by the IWC.

Japanese translations of the Planning Report and the Data Records Usage Notes will be made available to the ship's crew before the meeting.

Attending the pre-cruise meeting will be: all researchers, plus the captain, boatswain, chief (or second) officer, chief operator, and chief engineer. The radio operator and chief engineer will probably be required for the first part of the meeting only. Best and Findlay are invited to attend.

As necessary, arrangements will be made by Ensor for training in use of the SCANS system.

18.2 Post-cruise Meeting

As there is again only one vessel, it should be possible to complete the Cruise Report during transit from the Antarctic to Cape Town. Therefore a post-cruise meeting will only be necessary if that is not possible. If a post-cruise meeting is necessary, it will be held in Cape Town on 24-25 February 2007 at a venue to be arranged by Best; all researchers and the captain would be required to attend. Best and Findlay would also be invited to attend.

18.3 Home port arrangements

The vessel owners will consult with the home port shipping agents to make the necessary arrangements for a berth for the research vessel.

18.4 Responsible persons

Hotel reservations for all researchers in Cape Town will be made by Best. Donovan will inform him immediately of the names of the researchers for him to make provisional hotel bookings for the pre-cruise period 18-20 December. Donovan will ask researchers to confirm their arrival dates with Best as a matter of urgency. As early as possible during the cruise, the Cruise Leader will confirm the researchers' post-cruise reservation requirements (see Item 18.2) and forward them to Best.

The home port contact details, including those for Best, are given in Annex D.

19. REPORTS

19.1 Planning meeting report

A copy of the final version will be emailed by the IWC Secretariat to the Steering Group, the Chairman of the Scientific Committee, ICR, the home port organisers, all researchers and reserves, and the South African and Norwegian Governments.

19.2 Cruise report

A draft of the cruise report will be prepared, in accordance with the guidelines documented in IWC (1993), prior to arrival in Cape Town and, as necessary, the draft will be reviewed during the Post-cruise Meeting (either on board the vessel or in Cape Town) – see Item 18.2.

The Cruise Leader will email the final report to the IWC from Cape Town.

Copies of the final report will be forwarded by the IWC Secretariat to all Steering Group members and Butterworth, all researchers, the captain and the South African and Norwegian Governments.

20. OTHER LOGISTICS

20.1 Press release

The Cruise Leader, in consultation with Kato and the IWC Secretariat, will draft a pre-cruise press release for issue by the IWC Secretariat. The statement should be available in Cape Town at least one week prior to the ship's arrival. A press release will be sent by the Cruise Leader to Best near the end of the cruise, so that it can be available in Cape Town prior to the ship's arrival. Copies of all press releases will be sent to the Steering Group and the IWC Secretariat, and placed on the IWC website.

Statements to the press during the cruise and while the ship is in port will be made only by the Cruise Leader.

The Japanese Consulate should be asked by the IWC Secretariat to assist as necessary with press relations in Cape Town.

Donovan reported in this context that the SOWER website was being updated.

20.2 Security

Extra security, as provided on previous cruises, may be helpful in Cape Town. As on previous cruises, the display of 'Research' on the side of the vessel and the display of the IWC flags are intended to help reduce security problems in port. Large IWC banners for display on the ship when in port are also available. The IWC Secretariat is asked to contact the South African Government to request that adequate security arrangements be made for the vessel. The meeting noted that the Japanese Government may also contact the South African Government on the matter.

20.3 Accommodation and food costs

The daily subsistence charge aboard the ship will be ¥2500 per day for each researcher. The IWC will make direct payment of these fees to the Institute of Cetacean Research for the IWC-funded researchers.

As last year, a charge for alcoholic drinks will be made except on special occasions.

20.4 Other matters

The meeting noted that any change of plan, e.g. unavoidable delay in departure of vessels from port, be communicated to the Japanese authorities through Kato, with a copy to Matsuoka by email beforehand.

B. Future Cruises

B1. TERMS OF REFERENCE

The meeting considered the report of the Intersessional Workshop on future SOWER cruises (Part B of SOWER/06/WP04) as discussed in St Kitts by the IA Subcommittee (SOWER/06/WP03, Annex G, Item 2.3).

The long-term objective of any future SOWER programme as agreed by the Scientific Committee at its 2004 meeting is

to provide information to allow determination of the status of populations of large whales that feed in the Antarctic waters. The programme will primarily contribute information on abundance and trends in abundance (including of Antarctic minke whales), learning from both the successes of past IDCR-SOWER cruises and the difficulties in interpreting previous results (IWC, 2004: 35).

Sub-objectives are: to consider methodological developments and improvements in abundance estimation and its interpretation; stock structure; abundance estimates and trends in abundance.

B2. OBJECTIVES

With the above as background the meeting reviewed the programme's short term (5-6 years) objectives, using last year's report (SOWER/06/WP04, p 17 Item 2.2) as the basis for discussion, as follows.

Priority item 1: Determining the proportion of Antarctic minke whales in the ice

Shimada referred to an update of the results he had presented at the St Kitts meeting, but there were problems with the data analysis which, as a result, was not yet complete. The aim was to provide a correction factor for minke whale abundance by comparing abundance by 10° sector each year with the known ice cover for that year.

Bravington presented SOWER/06/WP21, outlining a proposal by Australia to provide 160+ hours' flying time in two fixed-wing aircraft in the 2007/8 summer season, in the area of Davis and Casey Bases (80°E and 110°E respectively). The primary aim would be to provide a basic check on whether there is a large proportion of minke whales within the sea ice, at least for one year and in one area. Australia sought guidance on potential areas with relatively high minke whale densities and enough summer ice cover for an inside/outside ice zone comparison to be meaningful. While providing a basic check would not involve high precision estimates, it might be possible to design a survey to provide quantitative results. A study is about to be undertaken to develop a comprehensive protocol. Additional data from e.g. satellite tagging operations in the vicinity would provide valuable information e.g. on relative surfacing rates inside and outside the zone. It would be very desirable to synchronize the survey with SOWER operations in the same longitudinal area, which could lead to an absolute abundance estimate of minke whales both inside and outside the ice. The most important benefit however would be long-term, in providing much better insight into the appropriate design of future SOWER minke whale surveys.

The meeting strongly welcomed the proposal, noting that it is as yet only a proposal and requires final approval. While the aim would be for the 2007/8 season, it was noted that the combined survey could also be done in a later year if 2007/8 was not feasible.

The meeting **agreed** that it should seek ways to develop a collaborative programme. It established an intersessional Working Group under Donovan to review the possibilities in detail. It noted that a collaborative programme in 2007/8 implies the availability of a SOWER research vessel then. Hatanaka also noted that JARPA will be operating in Area IV at that time.

Donovan's Working Group met during the meeting with the term of reference to develop a collaborative proposal for a combined survey involving the SOWER vessel and the Australian aircraft. For the survey to occur in 2007/8, the proposal must be ready for discussion at the 2007 Scientific Committee meeting. The Working Group recognised that in the short time available it was not possible to develop a proposal and therefore concentrated on establishing a mechanism that would enable a proposal to be developed in time. It was agreed that there are two main issues to consider, and established two intersessional Advisory Groups to consider each issue in more detail and report back to the full Working Group by 1 March 2006. A meeting of the full Working Group before it submits its report at SC59 may be necessary; Donovan will investigate the possibilities for this.

Advisory Group 1: Potential areas/times

The first issue is choice of area and time. This requires information on both ice conditions and minke whale occurrence. Subject to logistical restrictions on the times and places that the planes and boat can operate, the area

surveyed would ideally have substantial ice cover in summer that is reasonably consistent from year to year, as well as a fairly high density of minke whales outside the ice. Additional considerations concern other data that might become available via collaborative studies. Brownell has recently obtained pre-processed NASA satellite data that would allow an easy examination of ice cover. The Advisory Group (Hedley (convenor), Bravington, Brownell, Shimada) will consider data on minke whale densities from the SOWER and other cruises, as well as recent IWC SC papers dealing with ice cover.

Advisory Group 2: Design, field methods and analysis

The second issue concerns methods of designing and analysing aerial surveys for icy seas – particularly how to obtain absolute abundance estimates. An additional problem that must be addressed is the combination of the obtained aerial survey results with those from a shipboard survey of open water. There is a body of experience worldwide with aerial survey design, including some of icy conditions in both the Northern Hemisphere and the Antarctic (also with pinnipeds), and the expertise of IWC scientists will prove invaluable. Much work needs to be done if an effective design is to be available by the 2007/8 season. A great many details need to be considered to design an effective survey over ice, and there are important logistical/safety issues that need to be addressed early on, including modifications to the aircraft. If there is an opportunity to carry out preliminary flights during the 2006/7 field season, that could provide very valuable insights for the design.

The Advisory Group (Bravington (convenor), Donovan, Ensor, Hedley, Kitakado, Shimada) is planning an initial discussion to coincide with the JARPA review in December.

Priority item 2: Determining the best way of estimating $g(0)$ and school size

The question of increasing BT mode sample size by increasing BT effort in IO mode was raised but it was noted that logistical difficulties preclude this at least at present. There are plans this year to conduct more BT mode trials in Passing Mode, i.e. with no observers in the IOP which had been attempted last year, but it had proved too complex to record the data.

In discussion of this item and of Priority item 1, Bravington noted that interpretation of sightings data from the past 20 years would be potentially completed this year, with the two remaining major concerns; school size mis-estimation and $g(0)$ issues being addressed through the SSIII experiment and further trials of big eye BT mode planned for this year.

Priority item 3: Collecting data necessary to understand stock structure

Pastene reviewed the background to this item. In order to meet the long-term objective (i.e. to determine the status of populations), it is essential to understand stock structure. Last year it had been agreed that there should be a review of the available information, at least for each of the key stocks (minke, humpback and blue whales). Given the availability of only one vessel it is particularly important to be able to determine stock limits to permit best use of that single platform. It had not yet been possible to complete the review, but he expected to be able to provide a detailed report at SC59.

The meeting looked forward to obtaining the review. In addition it welcomed recent efforts to increase the available number of humpback and blue whale biopsy samples, and commended recent attempts to obtain information using satellite tags.

Brownell reported that the paper on blue whale genetics, utilising, *inter alia*, SOWER samples, was close to final submission for publication in *JCRM*. Pastene reported progress in analysing humpback samples from Areas III, IV, V and VI; the results had been presented at the April 2006 humpback whale workshop in Hobart, Tasmania.

Priority Item 4: Development of telemetry techniques

The meeting concurred with the view, expressed previously, that the SOWER programme is not an appropriate vehicle for the development of such techniques *per se*. As noted earlier, as yet there is no suitable system with sufficient reliability and longevity to be used on Antarctic minke whales at present, particularly from the SOWER vessel. However, it **reiterates** the importance of being able to utilise such techniques once developed. It noted that Australia expects to carry out some satellite tagging during 2007/8.

SOWER/06/WP10 contained information on a proposal to test a satellite tag delivery mechanism during the 2007 northern summer. The proposal appeared not to be addressed to the SOWER programme but rather to the Japanese Government, to test the equipment on vessels similar to those used in the SOWER programme.

The meeting noted that a full review of the proposal was not possible as details of the attachment mechanism to be used and the reliability and longevity of the tag were not sufficiently specified. However, it **agreed** to receive and note the proposal, and to **strongly encourage** the development of such systems.

Priority item 5: Development of new design of surveys and analysis of data

Last year, the Committee had agreed that it was important to undertake a review of issues surrounding likely achievable CV levels when only one vessel is operating before attempting to design the long-term SOWER programme. Hedley drew attention to investigations she and Bravington were undertaking on this matter and notes that the results of the 2006/7 cruise would be extremely valuable in this context. A report will be available at the 2007 Scientific Committee meeting.

Priority item 6: Development of methods to integrate acoustics with sightings surveys

It was recognised that given their lack of vocalisation, at least as recorded on last year's cruise, there was little possibility of such integration assisting in studies of fin whales. It would be of much greater benefit in research on sperm, humpback and blue whales, and particularly the latter.

It was noted that acoustic integration could include vessel-mounted equipment, sonobuoys or 'pop-up', ocean floor, systems. The programme is likely to be achievable more in the long-term than the short term.

Acoustics could be of benefit in photo-identification/biopsy mark-recapture studies, e.g. of blue whales, where they could be used to locate animals not located visually and thus increase sample size. Indeed for some species (e.g. sperm whales) it may be more efficient to use acoustics rather than sightings surveys to estimate abundance.

B3. METHODS TO ACHIEVE THE OBJECTIVES

In general discussion of this item, the meeting **agreed** that this year's task was to review progress made since last year in considering how to achieve the programme's objectives where only one vessel was available (see Item 2). It continued to endorse the long term objective. It also continued to endorse the 'short term' objectives, recognising that this means a period of '5-6 years'. It looked forward to receiving the results of the various analyses, including those arising from this year's cruise, in due course and particularly at the 2007 Scientific Committee meeting.

In that context, there was some discussion of the need to cover areas not previously covered e.g. baleen whale breeding rather than feeding areas. Last year, there had been some success in surveying fin whales in the designated area 55-61°S, including a latitudinal area not previously surveyed. The meeting **agreed** that choice of areas should be based on addressing the agreed objectives rather than choosing new areas that might involve altered or new objectives.

The meeting then reviewed last year's recommendations (SOWER/06/WP04 Item 3).

It **recognised, reiterated, and re-endorsed** last year's **strong recommendation** (SOWER/06/WP04, p 17, penultimate para) that

- (1) the Japanese Government be requested to consider whether it might in future be able to provide a second vessel; and
- (2) other IWC nations be requested to contribute vessels, or equivalent ship time, to the programme.

In respect of (2) it **commended** the proposal for the Australian Government to provide aircraft time towards resolving the question of minke whale abundance within the ice (see Item 2, Priority 1), and **encouraged** the work of the Working Group under Donovan.

It noted that action was still required on the recommendation to maximise observer efficiency and use of research time (SOWER/06/WP04, p17 bottom para). It **recommended** that Matsuoka, Nishiwaki and Shigemune pursue the matter, and looks forward to receiving a report on this matter at the 2007 Scientific Committee meeting.

In respect of improved cooperation with other national and international programmes (SOWER/06/WP04 p18, para 1), it was noted that the matter had been reviewed at the St Kitts meeting, where Hedley and Moore were appointed to liaise with CCAMLR and SO-GLOBEC respectively. Hedley reported that a CCAMLR krill survey was planned for 2007/8 as part of the International Polar Year (IPY) but it was not yet certain that the cruise would take place. Ohsumi believed that while it was important to collaborate with CCAMLR and SO-GLOBEC, the SOWER programme should continue to take the lead in Antarctic cetacean surveys.

The meeting noted that the recommendations concerning analysis of the 2005/6 BT mode and acoustics data (SOWER/06/WP04, p18 para 2) had already been considered under Section A, Item 9.

It also noted that the three action items referred to in SOWER/06/WP04, p18, para 3 had also been covered in earlier discussions, either under this Item or earlier in the meeting.

C. Concluding remarks

On behalf of the IWC, Donovan reiterated his remarks last year that the Commission has in the past regarded, and still regards, the cruises as an extremely important element of its scientific work. He expressed gratitude to Kato as chairman, to the President, Tokyo University of Marine Science and Technology and his staff, to Hatanaka and his staff at ICR, and to the Government of Japan, for their assistance and hospitality throughout the meeting. He noted that the success of the cruises is very dependent upon the cooperation of crew and researchers and expressed his appreciation for the contribution to the meeting of those crew members who had been able to attend. He thanked the scientists who had come to the meeting and who put in much time on the cruises' behalf between meetings. In particular, he thanked the interpreters for undertaking their most difficult task so cheerfully and efficiently.

Captain Komiya responded on behalf of his colleagues at the conclusion of discussions under Part A. He expressed appreciation to all members for their keen participation in the meeting, especially those from overseas. He reiterated his view expressed last year that in the changed situation a great responsibility has been placed on his officers and crew to meet the new challenges, and that he was confident his crew would continue to meet those challenges successfully. He particularly remarked on the excellent relationship that had developed between the crew and the Cruise Leader, Ensor.

Kato expressed his personal thanks to all participants. This was the second occasion on which such a meeting had been held at the University. He wished everyone a safe journey home, and the forthcoming cruise every success.

The meeting concluded at 1627 hrs on 29 September 2006.

Annex A – List of Participants

John Bannister	Western Australian Museum, Australia
Mark Bravington	CISRO, Australia
Robert Brownell	Southwest Fisheries Science Center, U.S.A.
Greg Donovan	Head of Science, IWC, United Kingdom
Paul Ensor	Cruise Leader, New Zealand
Sharon Hedley	
Jiro Hyugaji	Fisheries Agency of Japan, MAFF
Hideaki Okada	Fisheries Agency of Japan, MAFF
Tomio Miyashita	National Research Institute of Far Seas Fisheries
Hiroyuki Shimada	National Research Institute of Far Seas Fisheries
Hiroshi Okamura	National Research Institute of Far Seas Fisheries
Hidehiro Kato	Tokyo University of Marine Science and Technology
Toshihide Kitakado	Tokyo University of Marine Science and Technology
Hiroshi Hatanaka	The Institute of Cetacean Research
Seiji Ohsumi	The Institute of Cetacean Research
Yoshihiro Fujise	The Institute of Cetacean Research
Shigetoshi Nishiwaki	The Institute of Cetacean Research
Luis Pastene	The Institute of Cetacean Research
Koji Matsuoka	The Institute of Cetacean Research
Takashi Hakamada	The Institute of Cetacean Research
Hiroto Murase	The Institute of Cetacean Research
Mitsuyo Mori	The Institute of Cetacean Research
Hirohisa Shigemune	Kyodo Senpaku Co., Ltd.
Kenichi Hosone	Kyodo Senpaku Co., Ltd.
Kazuki Fukutome	Kyodo Senpaku Co., Ltd.
Hiroyuki Komiya	Kyodo Senpaku Co., Ltd., Captain
Masataka Shiosaki	Kyodo Senpaku Co., Ltd., Chief Officer
Yasunari Tsuda	Kyodo Senpaku Co., Ltd., Chief Operator
Tadao Shibata	Kyodo Senpaku Co., Ltd., Boatswain
Norihiko Nakamura	Kyodo Senpaku Co., Ltd., Quartermaster
Shigeaki Hosoda	Japan Agency for Marine-Earth Science and Technology
Kiyoko Matsuse	Interpreter
Hiroko Yasokawa	Interpreter

Annex B - Agenda

A. The 2006/07 cruise

1. OPENING REMARKS AND WELCOMING ADDRESS
2. APPOINTMENT OF CHAIRMAN AND RAPPORTEURS
3. ADOPTION OF AGENDA
4. ORGANISATION OF THE MEETING
5. REVIEW OF AVAILABLE DOCUMENTS
6. REVIEW OF PLANNING DISCUSSIONS FOR THE 2006/07 CRUISE AT IWC58
7. AVAILABILITY OF RESEARCH VESSELS
 - 7.1 Research vessels offered by Japan
 - 7.2 Other possibilities
8. PRINCIPAL STRATEGY IN THE LIGHT OF ONLY ONE VESSEL BEING AVAILABLE
9. PRIORITIES FOR THE CRUISE
 - 9.1 BT Mode
 - 9.1.1 Continuation of the 2005/6 BT mode experiment
 - 9.1.2 Alternative BT mode, for possible use in future cruises
 - 9.2 School size estimation
 - 9.3 Visual dive time
 - 9.4 Fin whale abundance estimation
 - 9.5 Biopsy sampling/photo id
 - 9.6 Satellite tagging
 - 9.7 Acoustic studies
 - 9.8 Direct data entry; reducing errors in distance/angle estimation
10. REVIEW OF THE BUDGET
11. CRUISE PLAN
 - 11.1 General priorities, including allocation of research effort
 - 11.2 Itinerary
 - 11.3 Survey area
 - 11.4 Research vessel
12. DETAILS OF THE CRUISE
 - 12.1 Standard sightings
 - 12.1.1. Cruise track design and Itinerary
 - 12.1.2 Survey mode and research hours
 - 12.1.3 Number of crew on effort
 - 12.1.4 Navigation and research speeds
 - 12.1.5 Acceptable conditions
 - 12.1.6 Estimated Angle and Distance training and Experiment
 - 12.1.6 BT mode
 - 12.1.7 School size estimation
 - 12.1.8 Visual Dive Time
 - 12.1.9 Data format
 - 12.1.10 Computer Data Entry
 - 12.2 Other experiments
 - 12.2.1 Biopsy sampling and photo-identification
 - 12.2.2 Videotaping
 - 12.2.3 Oceanographic survey
 - 12.2.4 Acoustics
13. INTERNATIONAL RESEARCHERS AND ALLOCATION OF RESEARCH PERSONNEL
 - 13.1 Number of researchers
 - 13.2. Nomination and allocation of researchers

14. GENERAL PREPARATIONS FOR THE 2006/07 CRUISE

- 14.1 Identification of home port organiser
- 14.2 Entry and other permits
- 14.3 Review of recommendations from the 2005-2006 cruise (SC/58/IA1, p22)
- 14.4 Acoustics
- 14.5 Biopsy/photo-identification
- 14.6 Direct Data Acquisition

15. IN TRANSIT SURVEY

- 15.1 Japan to Cape Town
- 15.2 Cape Town to Research Area
- 15.3 Antarctic to Cape Town
- 15.4 Cape Town to Japan
- 15.5 Necessary permits

16. TRANSPORTATION OF DATA, SAMPLES AND EQUIPMENT

- 16.1 Details
- 16.2 Necessary permits
- 16.3 Responsible persons

17. COMMUNICATIONS

- 17.1 Safety aspects
- 17.2 Between Cruise Leader and IWC
- 17.3 Ice information
- 17.4 Other official communication
- 17.5 Private communications
- 17.6 Terms of payment of communication costs

18. MEETINGS

- 18.1 Pre-cruise Meeting
- 18.2 Post-cruise Meeting
- 18.3 Home port arrangements
- 18.4 Responsible persons

19. REPORTS

- 19.1 Planning meeting report
- 19.2 Cruise report

20. OTHER LOGISTICS

- 20.1 Press release
- 20.2 Security
- 20.3 Accommodation and food costs
- 20.4 Other matters

B. The future

B1. TERMS OF REFERENCE

B2. OBJECTIVES

- Priority item 1: Determining the proportion of Antarctic minke whales in the ice
 - Advisory Group 1: Potential areas/times
 - Advisory Group 2: Design, field methods and analysis
- Priority item 2: Determining the best way of estimating $g(0)$ and school size
- Priority item 3: Collecting data necessary to understand stock structure
- Priority Item 4: Development of telemetry techniques
- Priority item 5: Development of new design of surveys and analysis of data
- Priority item 6: Development of methods to integrate acoustics with sightings surveys

B3. METHODS TO ACHIEVE THE OBJECTIVES

Annex C – List of documents

SOWER/06/WP

1. Extract from 58th IWC/SC report
2. Extract from Report of the Sub-committee on In-depth Assessment (IA) (58th IWC/SC report, Annex G)
3. Report of the small group for future SOWER planning, including the 2006/07 cruise (Appendix 2 of Annex G, 58th IWC/SC report)
4. Report of the Planning Meeting for the 2005/2006 IWC/SOWER Cruise and future cruises
5. IWC SOWER Circumpolar Cruise 2005/2006 Information for Researchers
6. 2005-2006 International Whaling Commission-Southern Ocean Whale and Ecosystem Research (IWC-SOWER) Cruise (SC/58/IA1)
7. E-mail from Peter Best (20 July 2006)
8. 2006/07 IWC-SOWER Crew List
9. Report of the Planning Meeting for the IWC/IDCR Soutjern Hemisphere Minke Whale Assesment Cruise in 1984/85
10. Suggestion for instrumentation and tagging technics of baleen whales
11. Agent List
12. IWC-SOWER 2005/2006 Cruise equipment
13. Required equipment (by Matsuoka)
14. E-mail from Best (Comments on Tagging Proposal)
15. Preliminary analysis of the IWC-SOWER Cruise 2005-06: BT mode experiments
16. Preliminary Report of Blue Whale Photo-identification From IWC-SOWER 2005/2006
17. E-mail from Butterworth (Comments on WP15)
18. E-mail from Borchers (Reply to WP17)
19. E-mail from Butterworth (Reply to WP18)
20. Data record methodology of large aggregation of pilot whales in th Faroese survey
21. Outline proposal fro plane & ship survey of minke whales in sea ice
22. Addendum to preliminary analysis of the IWC-SOWER Cruise 2005-06: BT mode experiments
23. E-mail from Butterworth (Comments on WP22)

Annex D – Action Table

Item	Task	Agenda Item	Responsibility
BT Mode	Formulate specific suggestions related to further data analysis, particularly on estimated swimming speeds, to be passed on to Burt.	9.1.1	Hedley, Bravington
School size estimation	Develop a detailed school size estimation protocol based on the existing SSII.	9.2	Ensor, Matsuoka, Hedley, Donovan
Direct data entry	Investigate training for an automated distance- and angle-measuring system.	9.8	Donovan, Hammond, Leaper
Computer data entry	Look into use of modified version of <i>Logger</i> software.	12.1.7	
Data format	Continue development of digital database for recording and cross-referencing photo-ID and biopsy data. Provide the Data Records and Usage notes to the ICR as soon as possible.	12.1.6 12.1.6	Olson and Donovan Donovan and Ensor
Biopsy sampling and photo-ID	Ensure new digital camera available to the cruise.	12.2.1	Donovan and Olson
Acoustics	Following consultation, provide details of the acoustic equipment, software and protocols to be implemented.	12.2.4	Clark, Donovan, Ensor and others
Nomination and allocation of researchers	Inform all applicants of the selection outcome immediately and ask those selected to forward necessary personal details, including passport numbers, to Shimada immediately. Dietary requirements will need to be forwarded to Matsuoka.	13.2	Donovan
Preparations for the 2006/07 cruise	Arrange for the IWC to approach the South African and Norwegian Commissioners so they can cooperate with entry and permit requests. Arrange permits and entry requests for Japan.	14.2 14.2	Donovan/Secretariat Hyugaji, Shimada
Review of recommendations from 2005/06 cruise	Ship new biopsy darts to Cape Town on or around 9 th October. Develop protocols for electronic data recording of biopsy samples and photographs. Purchase additional computer/hard drive for storing digital images. Purchase dedicated acoustics computer and associated software.	14.3 14.3 14.3 14.3	Donovan to oversee Donovan to oversee
Communications	Send a weekly progress report to the IWC Secretariat and Steering Group. A report should also be sent after the completion of each phase of research as appropriate.	17.2	Ensor (Cruise Leader)
Meetings	Inform Best of the names of the cruise researchers so that a provisional booking can be made on their behalf for the pre-cruise period. Ask researchers to confirm their arrival dates in Cape Town with Best. Confirm the researchers' post-cruise reservation requirements and forward them to Best. Make hotel reservations in Cape Town for all researchers.	18.8 18.4 18.4	Donovan Ensor (Cruise Leader) Best/Findlay

Other logistics	In consultation with Kato and the IWC Secretariat, the Cruise leader will prepare a pre-cruise press release for issue by the IWC. This should be available in Cape Town at least a week before the ship's arrival. A press release will also be sent to Best near the end of the cruise, so that it is available in Cape Town prior to the ship's arrival. Copies of all press releases should be sent to the Steering Group and the IWC Secretariat.	20.1	Ensor (Cruise Leader)/Best/Secretariat
	Place press releases on the IWC website.	20.1	Secretariat
	Ask the Japanese Consulate to assist as necessary with press relations in Cape Town.	20.1	
	Update the SOWER part of the IWC website.	20.1	Secretariat Donovan/Secretariat
Security	Contact the South African Government to request that adequate security arrangements be made for the research vessel.	20.2	Secretariat
Accommodation and food	Pay the ICR fees for the IWC-funded researchers (2,500 Yen per day for each researcher).	20.3	Secretariat
Other	Inform Japanese authorities through Kato (with a copy to Matsuoka) of any changes of plan (e.g. delay of vessels).	20.4	All involved, Kato
Future cruise objectives	Potential area/times Advisory Group to consider issues (particularly with relation to data on minke whale densities) and report back to full Working Group by 1 st March 2007.	B2	Hedley, Bravington, Brownell, Shimada
	Design, field methods and analysis Advisory Group to consider issues and report back to full Working Group by 1 st March 2007. An initial discussion is planned to coincide with the December 2006 JARPA review meeting.	B2	Bravington, Donovan, Ensor, Hedley, Kitakado, Shimada
	Investigate possibility of a meeting of the full Working Group, before its report is submitted at SC/59.	B2	Donovan
Development of new design of surveys and analysis of data	Make a report on this subject available at SC/59.	B2	Hedley, Bravington
Methods to achieve the objectives	Request the Japanese Government to provide a second research vessel and request other IWC nations to contribute vessels, or equivalent ship time to the SOWER programme.	B3	Secretariat
	Prepare a report on maximising observer efficiency and use of research time, to be made available at SC/59.	B3	Matsuoka, Nishiwaki, Shigemune