AGSO Formats for Marine Navigation Digital Data

by

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AGSO

AUSTRALIAN GEOLOGICAL SURVEY ORGANISATION

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INTRODUCTION

This Record describes the ASCII formats used to store data in the MARSHOT marine shot-based database (Tracey, 1995) as well as the format used in exporting time-based track data from the MARDAT marine time-based database.

The document contains an update of the navigation formats described in AGSO Record 1993/98 (Barton, Petkovic, Johnston, 1993).

ASCII FORMATS

UKOOA

The AGSO modified-UKOOA[1] **high precision format** has been in use from AGSO survey 127 onwards and is defined as:

Column			
	1 - 16	Line name (left justified)	A16
	17 - 23	Shot point number	I7
	24 - 33	Latitude (deg, min, sec, N/S)	I2, I2, F5.2, A1
	34 - 44	Longitude (deg, min, secN/S)	I3, I2, F5.2, A1
	45 - 52	Total gravity field (μm/s^2)	I8
	61 - 65	Water depth (metres, negative)	I5
	66 - 75	Julian day (ddd) and UTC (hhmmss)	I3, 3I2, I1
	76 - 80	Magnetic field (nT)	I5

The AGSO modified-UKOOA **normal precision** format used before AGSO survey 127 is:

Column			
	1 - 16	Line name (left justified)	A16
	17 - 23	Shot point number	I7
	26 - 34	Latitude (deg, min, sec, N/S)	I2, I2, F4.1, A1
	35 - 44	Longitude (deg, min, sec, N/S)	I3, I2, F4.1, A1
	45 - 52	Total gravity field (μm/s^2)	I8
	61 - 65	Water depth (metres, negative)	I5
	66 - 75	Julian day (ddd) and UTC (hhmmss)	I3, 3I2
	75 - 80	Magnetic field (nT)	I6

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[1] United Kingdom Offshore Operators Association

The **UKOOA P1/90** post-processed navigation file standard format follows. It has routinely been provided to external commercial contract clients since AGSO survey 189. See (UKOOA, 1990) for further details on data records and header definitions.

Column			
	1 - 1	Record Identification	A1
	2 - 13	Line name (left justified)	A12
	14 - 16	Spare	3X
	17 - 17	Vessel ID	A1
	18 - 18	Source ID	A1
	19 - 19	Tailbuoy/other ID	A1
	20 - 25	Shot point number	I6
	26 - 35	Latitude (deg, min, sec, N/S)	I2, I2, F5.2, A1
	36 - 46	Longitude (deg, min, sec, N/S)	I3, I2, F5.2, A1
	47 - 55	Map grid easting (m)	F9.1
	56 - 64	Map grid northing (m)	F9.1
	65 - 70	Water depth (metres, positive)	F6.1
	71 - 73	Julian day	I3
	74 - 79	Time (hms)	3I2
	80 - 80	Spare	1X

Record ID codes (column 1) are:		
	"S"	Centre of Source
	"G"	Receiver Group
	"Q"	Bin Centre
	"A"	Antenna Position
	"T"	Tailbuoy Position
	"C"	Common Mid Point
	"V"	Vessel Reference Point
	"E"	Echo Sounder
	"Z"	Other, defined in header H0800

TIME-BASED ASCII

PSEUDO-UKOOA FORMAT

A format, which is used to provide time-based data for import into Petroseis[2] for seismic surveys, is referred to as pseudo-UKOOA and is defined below. This data format is only produced where seismic data are available.

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[2] Product of Petrosys Pty Ltd.

Column	1 - 12	Line name (left justified)	A12
	14 - 16	Day number[3]	I3
	17 - 23	Time (.hhmmss)	F7.6
	24 - 30	Pseudo-SP number (running mins[4])	I7
	31 - 39	Latitude (deg, min, sec, N/S)	I2, I2, F4.1, A1
	40 - 49	Longitude (deg, min, sec, N/S)	I3, I2, F4.1, A1
	51 - 56	Water depth (metres, negative)	I6
	57 - 64	Total gravity field ($\mu m/s^2$)	I8
	65 - 69	Gravity free-air anomaly ($\mu m/s^2$)	I5
	70 - 75	Magnetic field (nT)	I6
	76 - 80	Magnetic IGRF anomaly (nT)	I5

DAY FORMAT

An alternative time-based format, which is mainly used for surveys where seismic data were not acquired (eg. AGSO surveys or data from foreign institutions), is referred to as (UKO)DAY format and is defined below:

Column	1 - 8	Line name (AGSO surv. id/day)	A8
	9 - 15	Time (.hhmmss)	F7.6
	17 - 20	Time, Pseudo-SP number (dec. hours * 100)	I4
	22 - 30	Latitude (deg, min, sec, N/S)	I2, I2, F4.1, A 1
	31 - 40	Longitude (deg, min, sec, N/S)	I2, I2, F4.1, A1
	43 - 47	Water depth (metres, negative)	I5
	49 - 55	Total gravity field ($\mu m/s^2$)	I7
	57 - 61	Free-air anomaly ($\mu m/s^2$)	I5
	63 - 68	Total magnetic intensity (nT)	I6
	70 - 74	IGRF anomaly (nT)	I5
	76 - 80	Bouguer anomaly ($\mu m/s^2$)	I5

This output format creates both a pseudo-shot and pseudo-linename and is used when working with data from the entire survey. The track data are split into fictitious linenames (comprising of the survey number and day) at the start of each new day and can be imported into shot-based mapping software.

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[3] Normally the Julian day, but sometimes the number of days into the survey (eg as with AGSO CMS surveys), depending upon the day numbering convention used during acquisition of the survey.

[4] This figure is obtained by converting the day number and time into running minutes from the start of year or survey. It is determined by the formula (day number -1)*1440 + hh*60 + mm. It is needed for software packages which accept the data in shot- and line-based format, such as Petroseis.

MGD77

The MGD77 ASCII format (Hittelman et al., 1993) is the accepted international standard used for the storage of geophysical data. Below are the formatting details for the data records.

Column			
	1 - 1	Data record type	I1
	2 - 9	Cruise identifier	A8
	10 - 14	Time-zone correction	F5.2
	15 - 16	Year (last two digits only)	I2
	17 - 18	Month number (ie. 01 - 12)	I2
	19 - 20	Day of month	I2
	21 - 22	Hour of day	I2
	23 - 27	Minutes	F5.3
	28 - 35	Latitude (dec degrees)	F8.5
	36 - 44	Longitude (dec degrees)	F9.5
	45 - 45	Position type code	I1
	46 - 51	Bathymetry 2-way traveltime (secs)	F6.4
	52 - 57	Bathymetry corrected depth (m)	F6.1
	58 - 59	Bathymetric correction code	I2
	60 - 60	Bathymetric type code	I1
	61 - 66	Magnetics total field, sensor 1 (nT)	F6.1
	67 - 72	Magnetics total field, sensor 2 (nT)	F6.1
	73 - 78	Magnetics residual field (nT)	F6.1
	79 - 79	Sensor for residual field	I1
	80 - 84	Magnetics diurnal correction (nT)	F5.1
	85 - 90	Depth/altitude of magnetic sensor	F6.0
	91 - 97	Observed gravity (mgal)	F7.1
	98 -103	Eötvös correction (mgal)	F6.1
	104 -108	Free-air anomaly (mgal)	F5.1
	109 -113	Seismic line number	A5
	114 -119	Seismic shot-point number	A6
	120 -120	Quality code for navigation	I1

For a full description of the data and header format specifications see file MGD77.TXT on the "GEODAS SETUP" National Geophysical Data Center (NGDC) CD-ROM disc, Vol. 1, Vers. 3.

REFERENCES

Barton, T., Johnston, N., and Petkovic, P., 1993 - AGSO formats for marine seismic & navigation digital data *AGSO Record* 1993/98.

Hittelman, A., Groman, R., Haworth, R., Holcombe, T., McHendrie, G., Smith, S., 1993 (Revised Ed) - The Marine Geophysical Data Exchange Format - "MGD77" (bathymetry, magnetics and gravity), *US Department of Commerce, NOAA*.

Parums R, 1998 - Archival record of non-seismic data processing for marine navigation, gravity, magnetic and water depth data *AGSO Record* 1998/3.

Tracey, R., 1995 - MARSHOT AGSO's marine seismic shotpoint location database *AGSO Record* 1995/57.

UKOOA, 1990 - P1/90 Post plot data exchange tape 1990 format, internal publication.

APPENDIX 1 - TABLE OF AGSO ASCII FILE FORMATS

	Time-based file	Pseudo-UKOOA file	UKOOA file
Data extent	Whole ship's track	Over seismic lines only	Over seismic lines only
File naming nomenclature	[S/F]nnnXX.ASC eg. F235FD.ASC	P[S/F]nnnXX.ASC eg. PF012AN.ASC	SnnnXX.ASC eg. S169FD.ASC
Linename	Pseudo	Real	Real
Line naming convention	nnnnTmmm	nnnPmmm[pp]	nnn/mmm[pp]
Shot	Pseudo	Pseudo	Real
Basic description	File in ASCII format based on time. Normally sampled every 60 secs.	File in ASCII format based on time. Nominally sampled every 60 secs.	Industry-standard, 80-character ASCII file based on linename and shot number.
Survey class	All time-based surveys, either AGSO or foreign, which are contained in database.	All AGSO seismic surveys - in particular, where no final quality UKOOA file exists in database.	Seismic surveys which have had processing completed to UKOOA file stage.
Created by program	UKODAY and MAKEDB	PUKOUT	UKOUT and since S189, a direct product from the ship.

	Time-based file	Pseudo-UKOOA file	UKOOA file
Data contained and Format	<u>Data</u>: linename, Julian day + time, pseudo-SP, latitude, longitude, water depth, total gravity, free-air anomaly, magnetics, IGRF anomaly and bouguer anomaly. <u>Format</u>: A8, F7.6, I5, X, A9, A10, 2X, I5, X, I7, X, I5, X, I6, 2(X, I5).	<u>Data</u>: linename, Julian day + time, pseudo-SP, latitude, longitude, water depth, gravity, free-air anomaly, total magnetics and IGRF anomaly. <u>Format</u>: A12, X, I3, F7.6, I7, A9, A10, I7, I8, I5, I6, I5.	<u>Data</u>: linename, shot, latitude, longitude, gravity, water depth, Julian day, time, magnetics. <u>AGSO high-precision modified-UKOOA format</u>: A16, I7, A10, A11, 8X, I8, I5, I3, F7.6, I5. Also use AGSO normal precision modified-UKOOA and UKOOA P1/90 formats.

The table above shows the major differences between the standard ASCII formats that are either derived from, or found within the MARDAT databases. In the file naming nomenclature row, P = pseudo-UKOOA format, [S/F] = either one of AGSO survey (S) or foreign survey (F), nnn = survey number, XX = degree of processing of source file in MARDAT database: either preliminary navigation only (PN), final navigation only (FN), preliminary data + navigation (PD) or final data + navigation (FD).

In the line naming convention row, the time-based file has four digits (nnnn) representing the AGSO survey ID where foreign surveys are designated by numbers greater than 1000 and AGSO surveys by numbers between 1 - 1000; a separator 'T' followed by a three-digit day number (mmm). The pseudo-shot file has linenames comprising a three-digit survey number, a 'P' separator and a string of digits representing seismic line sequence numbers (mmm)[5] and part numbers (pp), if they exist. The standard AGSO UKOOA file represents the linename by a three-digit survey number, followed by a '/' delimiter, a string of numbers representing the seismic line sequence number (mmm) and a part number extension (pp) either of the form p1, p2, p3 ... or 01, 02, 03 ..., if part numbers exist.

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[5] This number was usually created by counting the seismic lines in a survey in the order in which they were shot, eg the first line in a survey was given seqno 01, the second, 02 and so on. This was modified as seismic lines were shot in parts due to problems which caused the lines to be aborted and re-continued later. In these cases, the sequence numbers were given the form 0101, 0102, representing seqno 1 part 1, seqno 1 part 2, and so on. There have been some Rig Seismic surveys where the sequence numbers were given the form 001, 002 etc. For CMS surveys (AGSO survey ID 1-19), line parts were introduced into the seismic line naming nomenclature at the processing stage to distinguish breaks in the seismic lines due to looping etc. Note: The linenames on CMS seismic sparker sections are not annotated in any way with line part numbering.