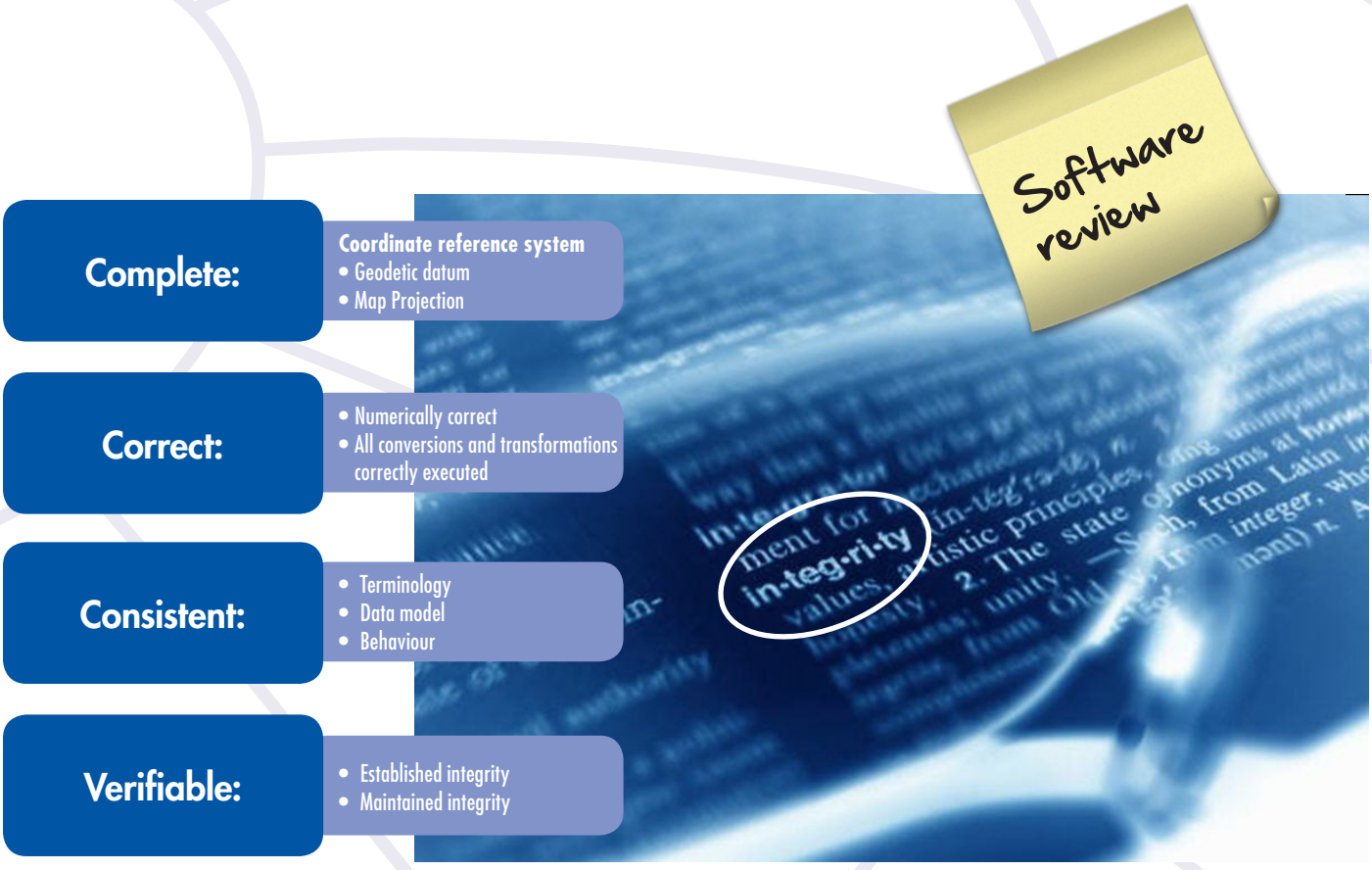
OGP

Geospatial Integrity of Geoscience Software
Part 2 – GIGS software review

Report No. 430-2
September 2011



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Preface

The purpose of this guidance note is to provide geoscience software developers and users with recommended industry best practice to evaluate the capabilities of their software with respect to establishing and maintaining geospatial data integrity. The guidance note is a response to significant concern and user experiences of violations of geospatial integrity of data when using geoscience software, leading to incorrect results, inconsistent understanding and misleading information for the user community.

In 2008 this led to the formation of a joint industry project (JIP) sponsored by OGP to review the situation and produce a series of recommendations, a supported set of standard test data, and procedures for undertaking software review utilising that test data. OGP has taken the results of this Geospatial Integrity of Geoscience Software (GIGS) JIP and incorporated them in this guidance note which is in three parts:

1. *Part 1 – GIGS Guidelines* (OGP report № 430–1), describing the GIGS process;
2. *Part 2 – GIGS Software Review* (OGP report № 430–2, this document), containing a software review checklist to enable structured testing of geoscience software; and
3. *Part 3 – User guide for the GIGS Test Dataset* (OGP report № 430–3).

This guidance note is supplemented by a number of companion electronic files:

- *Software review checklist* – an MS-Excel spreadsheet intended to facilitate the execution of a geoscience software review and capture its results;
- *GIGS Test Dataset* – a series of data files to be used for testing of the algorithms and data exchange capabilities of the geoscience software.
- *Sample MS PowerPoint slides* – explaining GIGS process and business benefits.

The above digital documents and files are available from the OGP Geomatics Committee website – http://info.ogp.org.uk/geomatics.

This document, 430–2, contains the text of the software review checklist; however, the evaluator is strongly encouraged to make use of the MS-Excel spreadsheet provided for this purpose.

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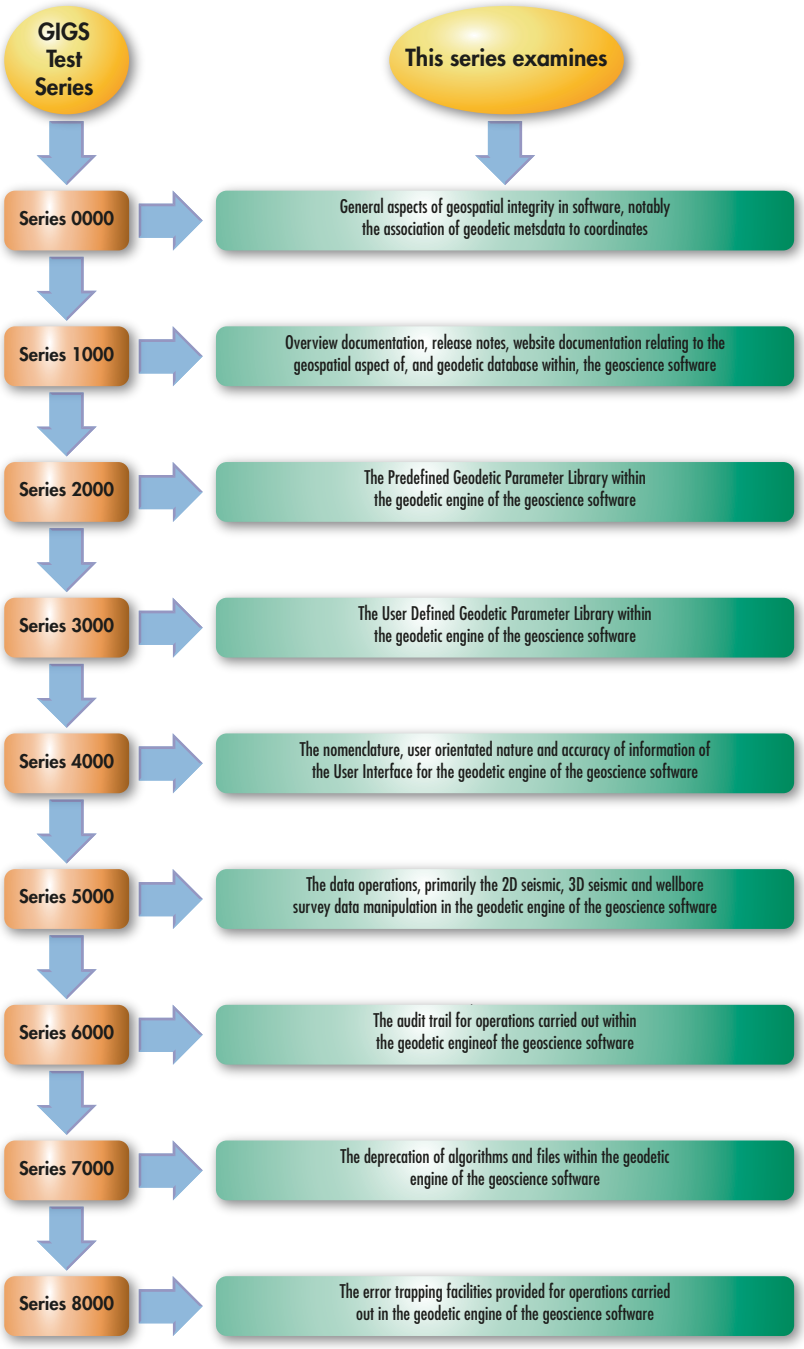
1 – Organisation of the GIGS software review checklist

This software review checklist follows the grouping into Test Series as presented in OGP Document 430 -1 'Geospatial Integrity of Geoscience Software – GIGS Guidelines' and as shown in figure 1 below.

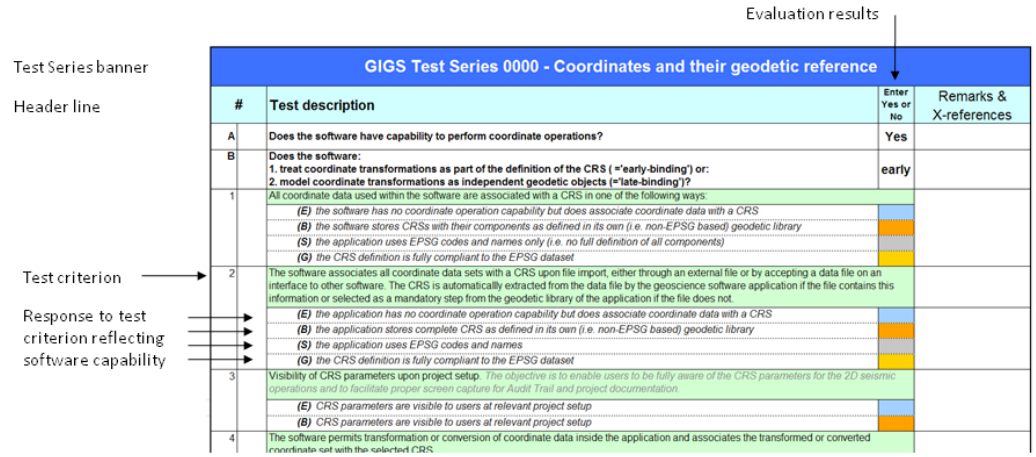
Figure 1 – GIGS Test Series



The description in this document focuses on the MS-Excel spreadsheet version of the check sheets. Whereas this document contains a separate chapter for each Test Series, the spreadsheet version contains a worksheet for each Test Series, intended to facilitate navigation.

For each Test Series sheet the actual Tests are preceded by a banner, indicating the subject of the Test Series and, where relevant, a box containing notes, applicable to that Test Series.

Figure 2 – Example of Checklist lay-out



The tests are numbered (1, 2, …) and, where relevant, sub-numbered [i), ii), ii), …]; the first two columns of the spreadsheets are reserved for this numbering. The test criterion is written in black font against a pale green background. Italic text in dark grey has been added to some test criteria to provide clarification of the test.

2 – Filling out the software review checklist

It is strongly recommended to use the MS-Excel spreadsheet version of the GIGS software review checklist to conduct the software evaluation. However, software evaluators who do not wish to do that can use the printed versions of the group of Test Series in this document. The main advantages of the spreadsheet version are the overview it provides by using 'worksheets' or tabs, and the automatic calculation of a summary score. Furthermore mistakes are less likely because the spreadsheet contains (limited) functionality for checking the consistency of entries. Also correction of mistakes is easier.

The evaluator should enter the response of the software to the test criterion into the column marked in the header with the text "Enter Yes or No". In the spreadsheet the fields in this column will only permit a "Yes "or "No" as valid entry values. Some tests offer several possible responses, reflecting the degree to which geoscience software may satisfy the test criterion. These reflect the Bronze, Silver and Gold classification levels explained in Section 3.3 of OGP document 430–1, *Geospatial Integrity of Geoscience Software Part 1 – GIGS Guidelines*. The relevant fields are colour-coded with a colour that symbolizes the classification level of the test; in addition the classification level of each possible response is indicated by a letter in bold and in brackets:

(E): response for Elementary level

(B): response for Bronze level

(S): response for Silver Level

(G): response for Gold level

In a number of instances an informative question precedes the test:

(-): informative question

Where multiple answers for a single test are provided in the checklist, software evaluators should enter only one response per test, for the classification level that describes the applicable software behaviour for that particular test. Compliance with lower level classification level is implied in any of the levels. For example: if a Silver score is appropriate for a particular test, then fulfilment of the requirements for the Bronze score is implied in the Silver score. If that is not the case, the software evaluator should qualify the response in the "Remarks and Cross-references column".

The last column of each Test Series worksheet allows the evaluator to record comments that qualify or provide additional information on the test response. As space is limited in this column, software evaluators may wish to create a separate file to record such information, entering cross-references in this worksheet column.

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3 – Elementary level

Geospatial integrity is also very relevant for geoscience software that has no functionality to perform coordinate conversions or coordinate transformations (collectively called coordinate operations). To such software the classification levels Bronze, Silver and Gold are not relevant. Such software can only attain the Elementary level of geospatial integrity. Software evaluators evaluating this type of software should ensure that the answer to the question A in Test Series 0000: "Does the software have capability to perform coordinate operations?" has been set to "NO".

The test responses relevant for these software packages are indicated separately by an (E) preceding the response text and a blue field in which to enter the response. For geoscience software that has no functionality to perform coordinate operations, ***do not fill in any of the (B), (S) or (G) responses!***

4 – GIGS Test Dataset

Software evaluators should use the GIGS Test Dataset to evaluate the geospatial capabilities of their software numerically. OGP Document 430-3: *Geospatial Integrity of Geoscience Software Part 3 – User Guide to the GIGS Test Dataset* contains a detailed description of each test to be performed, included the expected outcome of each test. The tests in the GIGS Test Dataset are grouped per Test Series, with each test having a unique number corresponding to the number of the relevant Test Series. For example the tests in the GIGS Test Dataset, belonging to Test Series 5100 (Data Operations (map projections)) are numbered 5101 to 5113.

The results of each test should be entered into the check sheet with Yes for a pass and No for a fail.

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5 – Specific comments on the software review checklist

5.1 GIGS Test Series 0000 – Coordinates and their geodetic reference

The tests in this series address general aspects of geospatial integrity, specifically behaviour of the software with respect to the association of coordinates with a valid CRS. The spatial data involved includes seismic data and wellbore data but also extends to other spatial data.

In some questions the terms 'unspecified CRS', <null CRS> or 'invalid CRS' may be presented. The first two terms refer to situations where no CRS information is associated at all with a spatial data file, the latter to instances where incomplete or (partially) incorrect information on the CRS is provided.

Test Series 0000 contains two preliminary questions A and B (see Figure 2 above), that have a bearing on the entire check sheet and are crucial for the behaviour of the software with respect to geospatial integrity:

> *Does the software have capability to perform coordinate operations?*

and:

> *Does the software:*
>
> 1. *treat coordinate transformations as part of the definition of the CRS (='early-binding') or:*
> 2. *model coordinate transformations as independent geodetic objects (='late-binding')?*

These must be answered.

5.2 GIGS Test Series 1000 – Documentation and Release Notes

The tests in this Series refer to the consistency and coverage of the overview documentation and release notes of the software. Tests referring to specific subjects are grouped in the Test Series relating to that subject.

5.3 GIGS Test Series 2000 – Pre-defined Geodetic Parameter Library

This Test Series is intended to evaluate ***geodetic data*** held in the pre-defined geodetic parameter library of the software and the functionality immediately related to that.

In Test 1 the results are reported in matrix form (see figure 3 below), whereby the colour of the box indicates the 'level' to which the test refers. Where possible, as in Test 1 i), the level is also indicated in the text of the test. No entry should be attempted in any of the hatched fields.

Figure 3 – Reporting in matrix form in Test Series 2000

GIGS Test Series 2000 - Predefined Geodetic Parameter Library

Note: This Test Series is intended to evaluate *geodetic data* held in the predefined geodetic parameter library of the software and the functionality immediately related to that.

#		Test description	Geodetic data object	Remarks & X-references
1		Each of the geodetic data object types listed on the right should be tested for compliance with each of the criteria below. *In this Test the results are reported in matrix form, with the colour of the box indicating the grading of the test. Where possible, as in Test 1 i) the level is also indicated in the text of the test. Do not attempt to enter any data into the hatched fields.* *Record pass (= Y) or fail (= N) against GIGS Test Procedure:*	unit of measure 201; ellipsoid 202; prime meridian (other than Greenwich) 203; geodetic datum 204; geocentric CRS 204; geographic 3D CRS 204; geographic 2D CRS 204; map projection 205; projected CRS 206; coordinate transformation 207; vertical datum / vertical CRS 208; vertical transformations 209	
	i)	Nomenclature of geodetic data		
		***(S)** the naming for the relevant predefined geodetic data objects is internally consistent and unambiguous*		
		***(G)** The naming for the relevant predefined geodetic data objects is identical to their names in the EPSG Dataset*		
	ii)	Completeness: All geodetic data objects of each type, indicated to be of particular importance to the E&P industry in the relevant GIGS Test Dataset, are included in the Predefined geodetic library		
	iii)	Accuracy: For those geodetic data objects that are supported, the parameter values are correct and consistent with the EPSG Dataset, in the sense that the parameter values of the predefined geodetic data objects in the geodetic database meet the "Expected Results" provided in the GIGS Test Series 2000		
	iv)	Precision: For those geodetic data objects that are supported, the parameter values are expressed to the precision exhibited for the s... parameters within the EPSG Dataset (Higher precision is acc... ...al")		
	v)	EPSG codes: For th... EPSG Dataset ...		

5.4 GIGS Test Series 3000 – User-defined Geodetic Parameter Library

This Test Series is intended to evaluate the ***functionality*** of the user-defined geodetic parameter library of the software and the geodetic data that the user is able to create.

In analogy with Test Series 2000 the first test has to be reported in matrix form following the same principles.

5.5 GIGS Test Series 4000 – User Interface

This Test Series contains a number of general tests regarding the user interface, which includes the Graphical User Interface and any printed output. Most other user interface aspects are embedded in the other Test Series, as they specifically apply to the subject matter of that Test Series.

5.6 GIGS Test Series 5000 – Data operations

This test series deals with software capabilities with respect to specific types of data, which is frequently exchanged between software packages through industry standard data exchange formats. In addition it assesses software capabilities with respect to coordinate operations, i.e. support of algorithms for map projections, miscellaneous conversions and coordinate transformations.

Each category of data or tests are grouped in separate worksheets and are separately numbered as follows:

Series 5100 – Data operations (map projections)

Series 5200 – Data operations (coordinate transformations and miscellaneous conversions)

Series 5xxx – Index sheet for Test Series 5300 - 5500

Series 5300 – Data operations (2D seismic)

Series 5400 – Data operations (3D seismic)

Series 5500 – Data operations (Surface and wellbore deviation data)

Test Series 5100 and 5200 address the capabilities of the software regarding coordinate operations. The operation methods (algorithms) addressed in those Test Series and their grading reflect the view of the original GIGS JIP Executive Committee on their relevance to the industry.

The Index sheet 5xxx is intended to record which data exchange formats are supported by the software, given its functionality. The extent to which the software supports these formats should not be recorded in the index sheet, except as a high level indication. The detailed behaviour of the software with respect to these data exchange formats is evaluated in the Test Series 5300...5500.

For each of the formats supported by the software a separate sheet 5300...5500 should be filled out, after copying the relevant worksheet (in the Excel version of the check sheet) or the relevant section of this document.

Figure 4 – Index sheet for Test Series 5300 – 5500

GIGS Test Series 5300 - 5500: Data Operations - Index sheet

Note: The following table lists the data exchange formats that are considered important to the E&P industry.
Software evaluators should indicate in column E whether or not the relevant format is supported by the software.
For each of the formats supported by the software, the relevant Test Series worksheet (5300, 5400 or 5500) should be completed.
Copy the relevant worksheet and repeat the evaluation for each of the formats supported by the software.

	Index of formats for GIGS Test Series 5300 - Data Operations (2D seismic)	Supported by software?	Remarks / X-references
P1/84	An industry standard seismic post plot positioning data exchange format previously established by UKOOA and currently maintained by the OGP. Current version is P1/90 but the P1/84 version is still important for legacy data		
P1/90	An industry standard seismic post plot positioning data exchange format previously established by UKOOA and currently maintained by the OGP		
P1/11	An industry standard seismic post plot positioning data exchange format maintained by the OGP		
SEG-P1	Postplot location data exchange format 1983, *(generally superseded by OGP P1/90)*; the SEG-P1 format is still important with legacy data		
SEG-Y	Seismic data recording format, including position data. Version earlier than *Rev 1 2002*		
SEG-Y rev 1	Seismic data recording format, including position data. Current version is *Rev 1 2002*		
ASCII	Generic ASCII unstructured file or CSV file with 2D seismic navigation data		

	Index of formats for GIGS Test Series 5400 - Data Operations (3D seismic)	Supported software?	Remarks / X-ces
P1/90 Q-records	P1/90 Q records are utilized for bin-centre input data in 3D seismic surveys, even though such records do not represent the fi navigation bin-centre locations		
P1/11	An industry standard seismic post plot positioning data exchange form published by the OGP		
P6/98	An industry standard format for the definitio seismic bin UKOOA and currently m		
P6/11			

The GIGS Test Dataset contains 2D seismic test data in P1/90 format and 3D seismic data (bin grid definition) in P6/98 format. This does not preclude evaluation of the software's support of other formats and the software evaluator is encouraged to generate some test data for the other supported formats.

In the Test Series 5500 a distinction is made between a well track and a wellbore survey. Various alternative terms are in use in the industry, but no standard exists and the terms proposed in these Guidelines do not constitute a proposal for such standardisation. In the context of GIGS the term *wellbore survey data* refers to the raw measurement data of Measured Depth (MD), azimuth, inclination that have been gathered in a wellbore survey. The term *well track* refers to the collection of coordinates of identified points along the wellbore, calculated from the wellbore survey data using one of the algorithms in use in the industry, such as the minimum curvature method[1]) or the LMP method[2].

The GIGS Test Dataset contains test data in P7/2000 format, made available as an ASCII and an MS-Excel file.

5.7 GIGS Test Series 6000 – Audit Trail

This Test Series works on the assumption that the software generates an audit trail. The audit trail is populated by auxiliary metadata in respect of each data operation executed (i.e. create, import, merge, and data processing through to transfer & export). When all requirements, expressed in the tests below are satisfied, this contributes to the Gold scores of the software. If the software does not log details of all coordinate operations, this does not block a possible Silver score of the software in the summary result of the software review.

Some software may capture auxiliary metadata but not capture that in an audit trail. A number of tests specifically address this scenario.

5.8 GIGS Test Series 7000 – Deprecation

This Test Series describes requirements for the deprecation of geodetic data objects. Since deprecation is not yet an established aspect of the management of geodetic data objects in geoscience software, all tests are graded at the Gold level.

5.9 GIGS Test Series 8000 – Error Trapping

All software will include some error trapping mechanisms. The error trapping tests described in this Test Series aim to capture software behaviour regarding geospatial integrity. In the tests distinction is made between the following software responses:

- Warning flag (or message)
  - a message to the user informing him or her that geospatial integrity ***may*** be violated unless preventive actions are taken
- Error flag (or message)
  - a message to the user informing him or her that geospatial integrity ***will*** be violated; the software allows the user to proceed
- Strong error flag (or message)
  - a message to the user informing him or her of an imminent serious violation of geospatial integrity; the software ***blocks the intended action***.

1 *See: Sawaryn, S.J., Tulceanu, M.A.* A Compendium for Directional Calculations Based on the Minimum Curvature Method: Part 2. *Paper presented at the 2007 SPE Annual Technical Conference and Exhibition, Anaheim, California, USA, 11-14 November 2007.*

2 *See: Zinn, N.D.* Accounting for Earth Curvature in Directional Drilling. *SPE paper 96813. Paper presented at the 2005 SPE Annual Technical Conference and Exhibition, Dallas, Texas, USA, 9-12 November 2005.*

6 – Consolidation of evaluation results – GIGS grading

The supplied spreadsheet contains formulas that will automatically summarise the entries into a consolidated result per Test Series. This is helpful in reporting the results of any structured software reviews conducted with the GIGS methodology. The consolidated score for a given Test Series is worked out as follows.

To obtain e.g. a Silver level score for a Test Series, all tests that list a Silver-graded response should have a score of at least Silver, while all tests that only allow a Bronze-level response should have a score at that Bronze level. If even one test acquires only a Bronze score where a Silver option was listed, the overall score will revert to Bronze. If a Bronze-rated test response is missed, no GIGS rating is achieved at all.

The above method of scoring demonstrates the progressive nature of the GIGS rating: A Silver grade implies that all Bronze-rated requirements are met.

The consolidated score for any given Test Series therefore shows the minimum level at which the software is rated. It is, in other words, not possible to compensate shortcomings on one aspect of the software by superior results on other aspects.

The Elementary scores do not play a role in the evaluation of Bronze, Silver or Gold, as it applies to an entirely different category of software, without coordinate operation capability. For such software an Elementary grade can only be achieved if all tests containing a response for the Elementary category have received a "Yes" entry.

The last worksheet in the evaluation spreadsheet shows a summary of the scores obtained from each of the Test Series. It may be helpful in presenting the GIGS software review results in either a report of presentation. The contents of the 'Results' column are automatically picked from the original evaluation worksheet.

The person conducting the GIGS software review may have inserted additional worksheets for Test Series 5300, 5400 and 5500, in order to evaluate the handling of additional data exchange formats by the software. For such format evaluations an extra line may be created in the summary table of this worksheet. This is left to the discretion of the evaluator.

The following sections give the evaluation spreadsheet contents in hard copy form for those who prefer this to using the spreadsheet.

Whereas the software uses a yes/no box, this paper version requires a simple 'tick' for a yes and blank for no.

6.1 Coordinates and their Geodetic Reference (Series 0000)

#	Test description	Tick if applicable	Remarks & X-references
A	Does the software have capability to perform coordinate operations?		
B	If the answer to question A is "Yes", does the software: 1. treat coordinate transformations as part of the definition of the CRS (='early-binding') or: 2. model coordinate transformations as independent geodetic objects (='late-binding')?"		
1	All coordinate data used within the software are associated with a CRS in one of the following ways		
	(E) the software has no coordinate operation capability but does associate coordinate data with a CRS	☐	
	(B) the software stores CRSs with their components as defined in its own (i.e. non-EPSG based) geodetic library	☐	
	(S) the software uses EPSG codes and names only (i.e. no full definition of all components)	☐	
	(G) the CRS definition is fully compliant to the EPSG dataset	☐	
2	The software extracts the CRS from an imported data file or from the interface to other software; if CRS information is not available in the file or on the interface, it forces the user to select the CRS from its geodetic library		
	(E) the software has no coordinate operation capability but does associate coordinate data with a CRS	☐	
	(B) the software stores complete CRS as defined in its own (i.e. non-EPSG based) geodetic library	☐	
	(S) the software uses EPSG codes and names	☐	
	(G) the CRS definition is fully compliant to the EPSG dataset	☐	

#	Test description	Tick if applicable	Remarks & X-references
3	Visibility of CRS parameters upon project setup *The objective is to enable users to be fully aware of the CRS parameters for the 2D seismic operations and to facilitate proper screen capture for Audit Trail and project documentation"*		
	(E) CRS parameters are visible to users at relevant project setup	☐	
	(B) CRS parameters are visible to users at relevant project setup	☐	
4	The software permits transformation or conversion of coordinate data inside the software and associates the transformed or converted coordinate set with the selected CRS		
	(B) the software uses coordinate operation defintions from its internal non-EPSG library	☐	
	(S) the software uses coordinate operations from the EPSG dataset	☐	
5	The software permits the CRS, associated with a coordinate dataset, to be changed by a user with sufficient user privileges, without transforming or converting the coordinates		
	(E) the software has no coordinate operation capability but allows the user to change the CRS associated with coordinate data	☐	
	(B) the software uses coordinate operations from the EPSG dataset	☐	
6	The software automatically associates all coordinate data sets with their CRS upon file export		
	(E) the software has no coordinate operation capability but does associate coordinate data with their CRS	☐	
	(B) the software stores the CRS definiton as provided by the data source	☐	
	(S) the software uses EPSG codes and names	☐	
	(G) the CRS definition is fully compliant to the EPSG dataset	☐	
7	The software prompts user to specify CRS upon file export		
	(E) the software has no coordinate operation capability but shows the user the CRS parameters exported with the data	☐	
	(B) the software only allows export of data in the CRS in which it is stored, but shows the user the CRS parameters of the data	☐	
	(S) the software prompts the use to specify a CRS for export and shows the user the associated geodetic paramters	☐	
8	The software exports the CRS definition with the exported data file		
	(E) the software has no coordinate operation capability but exports the CRS defintion with the data	☐	
	(B) the software exports the CRS definition in a separate companion file with the exported data	☐	
	(S) the software exports the CRS definition, embedded with (i.e. in principle inseparable from) the exported data	☐	
	(G) the software exports the EPSG code of the CRS and/or CRS definition, embedded with (i.e. in principle inseparable from) the exported data	☐	
9	The software responds to the user upon attempts to merge and/or co-visualise geodetically incompatiable data in one of the following ways		
	(-) the software supports merging of datasets	☐	
	(E) by prompting the user to specify the CRS	☐	
	(B) by blocking the import, merge or co-visualisation, issuing a warning message to the user	☐	
	(S) by prompting the user to select the CRS from its geodetic library	☐	
10	Regarding merging/co-visualisation of geodetically incompatible data		
	(-) the software supports merging of datasets	☐	
	(E) the software blocks merging or co-visualisation of data referenced to different CRSs, or when one is unspecified (null)	☐	
	(B) the software blocks merging or co-visualisation of data referenced to different CRSs (including non-valid or unspecified CRS) but does not automatically transform the data	☐	
	(S) the software automatically transforms or converts coordinates upon merge to a common valid CRS (usually the 'project' or 'session' CRS), but will not transform/convert if one or more non-valid CRSs are involved.	☐	
	(G) the software validates the geodetic parameters of the CRS or transformation against the EPSG dataset and automatically transforms the data when the CRS of the data to be imported is found to be valid.	☐	
11	The software has additional features, offering a user help to identify the CRS of a geospatial dataset. The software will prevent a breach of geospatial integrity by e.g. not storing a dataset until it has been associated with a valid CRS		
	(G) it will allow merge or co-visualisation of spatial data where one of the data files has no CRS or an invalid, <null>, or unspecified CRS, but prevents a breach of geospatial integrity (or equivalent advanced feature)	☐	
12	Regarding the treatment of invalid or null CRS information, the software…		
	(E) …blocks merging or co-visualisation of spatial data where one of the CRSs is unspecified or a non-valid CRS	☐	

#	Test description	Tick if applicable	Remarks & X-references
	(S) …blocks merging or co-visualisation of spatial data where one of the CRSs is unspecified or a non-valid CRS	☐	
13	The software has functionality to determine whether a CRS or a coordinate transformation is valid or not and…		
	(B) …matches the name to a name in its own geodetic parameter library (pre-defined plus user-defined)	☐	
	(S) …matches the CRS or transformation to an EPSG code and/or the EPSG name of the geodetic entity	☐	
	(G) …matches the parameters of the CRS or transformation to the corresponding benchmark EPSG parameters	☐	
14	"Late-binding" configurations only: the software has functionality offering assistence to users which coordinate transformation to choose *This may be implemented in various ways, e.g. permitting defintion of one or more preferred transformations, by only offering coordinate transformations for selecting that are relevant for the area of the dataset extent or project area, etc.*		
	(B) the software allows the user to select from a list, without supplying help re: the appropriateness of each transformation	☐	
	(G) the software has functionality, offering users assistence in the selection of the appropriate coordinate transformation.	☐	
15	"Late-binding" configurations only: as part of the selection process of the appropriate coordinate transformation the user can see the key characteristics of the coordinate transformation. *The key characteristics are considered to be: the EPSG code, the (full) EPSG name, the area of validity or a combination thereof. The values of the transformation parameters may help a skilled user to identify the coordinate transformation but is generally not sufficient as a selection criterion.*		
	(S) the software displays EPSG/company codes and transformation parameter values	☐	
	(G) the software displays EPSG/company codes and the area of validity (and, possibly, the transformation parameters)	☐	
16	Prior to merging or co-visualisation of two (or more) datasets…		
	(S) …the software transforms/converts the coordinate data if the CRSs of the datasets are different to a common CRS (usually the 'project' or 'session' CRS)	☐	
17	"Early binding" configurations only: coordinate data belonging to two or more coordinate data sets with the same CRS, but associated with different coordinate transformations:		
	(G) will not be transformed upon to data merge or co-visualisation.	☐	
18	Regarding units of measure, the software…		
	(S) …prevents users from freely selecting the unit of measure of the coordinates	☐	
19	Regarding units of measure, the software…		
	(S) …allows different units of measure for vertical and horizontal coordinates within a project, as defined by the respective horizontal CRS and vertical CRS	☐	
20	Regarding units of measure, the software…		
	(S) …allows different units of measure for vertical and horizontal linear parameters within a project . Within a project, coordinate units of measure for length may be different from the drilling units of measure for length.	☐	
21	The ellipsoid is a component entity of the geodetic datum, which is in turn a component of the geodetic CRS		
	(S) the software prevents the selection of a CRS using the ellipsoid as the primary selection parameter	☐	
22	Regarding transforming coordinate data upon export, the software…		
	(S) …permits the user to specify a different CRS for exported coordinate data and transforms or converts the coordinates prior to export.	☐	
23	"Support of the two EPSG Dataset 7-parameter transformation methods (Position Vector 7-parameter transformation and Coordinate Frame Rotation transformation). *Appropriate user instruction on how to convert between these two methods is useful and should be documented if present.*		
	(-) the software supports 7-parameter transformation methods	☐	
	(B) only one of the two methods is supported (the method is implied)	☐	
	(S) only one of the two methods is supported (method explicitly stated; users are clearly warned/advised on this)	☐	
	(G) both methods are explicitly named and supported;	☐	
24	Definitions of coordinate transformations in the geoscience software…		
	(B) …are implicitly defined as "from <this CRS> to WGS 84"	☐	
	(S) …are explicitly defined as "from <this CRS> to WGS 84"	☐	
	(G) …are allowed to have any Source CRS and any Target CRS	☐	
25	Help in selection of valid CRSs and/or coordinate transformations		
	(S) the software has functionality allowing identification of valid CRSs and/or coordinate transformations), based on textual description of the Area of Use.	☐	
	(G) the software has functionality allowing identification of valid CRSs and/or coordinate transformations), based on spatial selection by polygon or bounding rectangle of the Area of Use .	☐	

6.2 Documentation and Release Notes (Series 1000)

#		Test description	Tick if applicable	Remarks & X-references
1	i)	The overview documentation…		
		(E) …provides a clear and accurate description of the purpose of the geoscience software	☐	
		(B) …provides a clear and accurate description of the purpose of the geoscience software	☐	
	ii)	The overview documentation…		
		(E) …provides a clear and detailed description of coordinate handling in the geoscience software	☐	
		(B) …provides a clear and detailed description of coordinate handling in the geoscience software	☐	
	iii)	The overview documentation provides a sufficiently detailed description of the geodetic data model used in the software *For example: "A projected CRS is built up of a base geographic CRS, a map projection and a coordinate system", and "Coordinate transformation requires a source CRS and a target CRS", "The following coordinate operation methods are used"*		
		(B) at least 80% of the all geodetic object types in the test dataset are covered	☐	
		(S) all object types in test data set are covered	☐	
		(G) object types over and above those in test dataset are covered	☐	
	iv)	The overview documentation provides lists of all coordinate operation methods supported by the software *This includes all supported map projection methods (such as Transverse Mercator, Albers Equal Area) and also coordinate transformation methods (such as 7-parameter position vector transformation method), etc.*		
		(S) the overview documentation contains a list of all coordinate operation methods supported by the software.	☐	
	v)	The overview documentation provides a list of data exchange formats supported *This refers in particular to the seismic and well data exchange formats mentioned in test series 5300, 5400 and 5500*		
		(E) the overview documentation contains a list of all supported data exchange formats.	☐	
		(S) the overview documentation contains a list of all supported data exchange formats.	☐	
	vi)	The overview documentation provides clear descriptions for troubleshooting the merging of datasets from, or export to, third party geoscience software applications		
		(E) the overview documentation provides instructions and help what such issues may be and how they are resolved.	☐	
		(S) the overview documentation provides instructions and help what such issues may be and how they are resolved.	☐	
	vii)	Provides clear descriptions for troubleshooting the merging of datasets from, or export to, different versions of the same software *E.g. CRS of a dataset from a previous version was listed as UNKNOWN but in the new version, it is assigned by default the first CRS in the database "look up"; CRS of dataset was UNKNOWN and merged to another dataset with the same CRS assigned the correct name (but without proper transformation being performed, etc.*		
		(E) the overview documentation provides instructions and help what such issues may be and how they are resolved.	☐	
		(B) the overview documentation provides instructions and help what such issues may be and how they are resolved.	☐	
2		Nomenclature for geodetic data objects is consistent throughout the overview documentation in e.g. descriptions of the pre-defined geodetic parameter library, user-defined geodetic parameter library, data operations (including data import and data export)		
		(B) this nomenclature is internally consistent, possibly partly based on EPSG nomenclature	☐	
		(S) this nomenclature fully adheres to EPSG nomenclature	☐	
3		Availability of overview documentation outside the software		
		(E) the overview documentation is available outside the software	☐	
		(B) the overview documentation is available outside the software	☐	
4		Availability of the overview documentation or detailed help inside the software		
		(E) user documentation or detailed help is available for viewing within the software	☐	
		(B) user documentation or a general help file is available for viewing within the software	☐	
		(S) a searcheable, indexed help file is available inside within the software application	☐	
		(G) context-sensitive help is available to the user in any software window	☐	
5		Table of Contents		
		(E) the overview documentation has a detailed table of contents	☐	
		(B) the overview documentation has a detailed table of contents	☐	

#		Test description	Tick if applicable	Remarks & X-references
6		Indexed content		
		(E) the overview documentation has a detailed index	☐	
		(B) the overview documentation has a detailed index	☐	
7		The overview documentation - i.e both user documentation and any training documentation - of the geospatial functionality		
		(E) is updated with every major software version in which the geospatial functionality was modified	☐	
		(B) is updated with every major software version in which the geospatial functionality was modified	☐	
8		Frequently Asked Questions (FAQ) section		
		(G) the overview documentation contains useful FAQs for the geodetic and geospatial functionality	☐	
9		Version numbering		
		(E) overview documentation, release notes and software have consistent version numbers	☐	
		(B) overview documentation, release notes and software have consistent version numbers	☐	
10	i)	Release notes contain…		
		(S) …detailed and accurate information of updated geodetic database files	☐	
	ii)	Release notes contain…		
		(S) …evidence and summary results of validation testing against a development test dataset	☐	
	iii)	Release notes contain…		
		(S) …evidence and summary results of validation testing self-certification against the GIGS Test Dataset	☐	

6.3 Pre-defined Geodetic Parameter Library (Series 2000)

Note: This Test Series is intended to evaluate geodetic data held in the pre-defined geodetic parameter library of the software and the functionality immediately related to that.

#	Test description	Geodetics data object												Remarks & x-Reference
		unit of measure	ellipsoid	prime meridian (other than Greenwich)	geodetic datum	geocentric CRS	geographic 3D CRS	geographic 2D CRS	map projection	projected CRS	coordinate transformation	vertical datum/vertical CRS	vertical transformation	
	Record pass (= Y) or fail (= N) against GIGS Test Procedure:	2001	2002	2003	2004	2004	2004	2004	2005	2006	2007	2008	2009	
1	Each of the geodetic data object types listed on the right should be tested for compliance with each of the criteria below. *In this Test the results are reported in matrix form, with the colour of the box indicating the grading of the test. Where possible, as in Test 1 i) the level is also indicated in the text of the test. Do not attempt to enter any data into the hatched fields.*													
i)	Nomenclature of geodetic data													
	(S) the naming for the relevant pre-defined geodetic data objects is internally consistent and unambiguous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
	(G) The naming for the relevant pre-defined geodetic data objects is identical to their names in the EPSG Dataset	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
ii)	Completeness: All geodetic data objects of each type, indicated to be of particular importance to the E&P industry in the relevant GIGS Test Dataset, are included in the Pre-defined geodetic library	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
iii)	Accuracy: For those geodetic data objects that are supported, the parameter values are correct and consistent with the EPSG Dataset, in the sense that the parameter values of the pre-defined geodetic data objects in the geodetic database meet the "Expected Results" provided in the GIGS Test Series 2000	☐	☐	☐					☐		☐		☐	
iv)	Precision: For those geodetic data objects that are supported, the parameter values are expressed to the precision exhibited for the same parameters within the EPSG Dataset (Higher precision is acceptable, but may be "artificial")	☐	☐	☐					☐		☐		☐	
v)	EPSG codes: For those geodetic data objects that are supported and are part of the EPSG Dataset, the correct EPSG codes are referenced and available to be seen in displays for the users		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
vi)	Company codes: For relevant geodetic data objects supported, but which are not in the EPSG Dataset, specific company codes are clearly defined. (Company codes may also be used for items that are contained in the EPSG Dataset)		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

#	Test description	Tick if applicable	Remarks & X-references
2	The Pre-defined geodetic parameter library is read only:		
	(S) pre-defined geodetic data objects and parameters cannot be modified or deleted by any user	☐	
3	The source of the geodetic data stored in the Pre-defined geodetic parameter library is:		
	(B) not or part-based on the EPSG dataset	☐	
	(S) the EPSG dataset	☐	
4	Users can easily and promptly obtain the Version number of the EPSG Dataset used in the Pre-defined geodetic library either via online documentation or by contacting the vendor's technical support.		
	(S) the Version number of the EPSG dataset is easily obtainable	☐	
5	The user is able to update the Pre-defined geodetic library to a recent release of the EPSG Geodetic Parameter Dataset		
	(S) by replacement of the library file(S) with new file(S) as and when supplied by the vendor	☐	
	(G) by using functionality in the software to (semi)-automatically update its library contents with new EPSG dataset	☐	
6	Users can view all the component geodetic data object details and parameter values for a given geodetic data object, based on selection of the principal geodetic data object		
	(S) all parameter values and components of geodetic data objects of pre-defined geodetic parameter library are visible to users through cursor control or drill-down menus	☐	
7	User documentation on the pre-defined geodetic data objects is fully comprehensive, as described in Series 1000 GIGS Test Procedures; the documentation for the pre-defined geodetic parameter library is consistent with the overview documentation		
	(S) User documentation on the pre-defined geodetic library is comprehensive and consistent with the overview documentation	☐	

6.4 User-defined Geodetic Parameter Library (Series 3000)

#	Test description	Geodetics data object													Remarks & x-Reference
		unit of measure	ellipsoid	prime meridian	geodetic datum	geocentric CRS	geographic 3D CRS	geographic 2D CRS	map projection	projected CRS	coordinate transformation	vertical datum/vertical CRS	vertical transformation	concatenated transformation	
	Record pass (= Y) or fail (= N) against GIGS Test Procedure:	3001	3002	3003	3004	3004	3004	3004	3005	3006	3007	3008	3009	3010	
1	Each of the geodetic data object types listed on the right should be tested for compliance with each of the criteria below. *In this Test the results are reported in matrix form, with the colour of the box indicating the grading of the test. Where possible, as in Test 1 i) the level is also indicated in the text of the test. Do not attempt to enter any data into the hatched fields.*														
i)	The software permits definition of the following new geodetic data objects	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
ii)	Units of Measure														
	(B) Units of defining parameters are implicit; the user is not free to select the unit when creating the relevant User defined geodetic data object		☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
	(S) The user is advised of any default and/or required units of measure assigned to each specific defining parameter for user-defined geodetic data object creation		☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
iii)	The facility for user-defined geodetic data object name is limited to less than the 80 characters allowed in the EPSG Dataset	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
iv)	Precision allowed: Users are allowed to enter parameter values to the precision exhibited for corresponding parameters within the EPSG Dataset *See GIGS Test Dataset for specific examples*	☐	☐	☐					☐		☐		☐		
v)	The documentation provides guidance to users to assist them in creating the following User-defined geodetic data objects	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

#	Test description	Tick if applicable	Remarks & X-references
2	New geodetic entities can be composed in part from components available in the Pre-defined geodetic parameter library		
	(S) the software uses a proprietary data model	☐	
	(G) the software uses the ISO 19111 model (as used in the EPSG Dataset)	☐	
3	The user is prompted by the software to make a selection or data entry for all mandatory components and attributes of the geodetic entity being defined. *The mandatory nature of geodetic entity components is specified in the ISO 19111 data model."*		
	(S) the software uses components in a proprietary data model	☐	
	(G) the software uses components as defined in the ISO 19111 model (as used in the EPSG Dataset)	☐	
4	Creation of incompletely defined geodetic entities (for example as a result of not selecting a mandatory component of that geodetic entity):		
	(S) storage of incompletely defined geodetic entities is not possible	☐	
5	User-defined geodetic data objects are differentiated from Pre-defined geodetic data objects and recognisable as such by the user. (G: codes; S: names)		
	(S) the software achieves this through the name or by other marker	☐	
	(G) the software uses codes for at least CRSs and, in the case of 'late-binding' soft coordinate transformations	☐	
6	There is a facility to identify suitable geographic area of interest for user-defined geodetic data objects (CRS and coordinate transformation)		
	(S) the software uses a textual desciption of the area of validity	☐	
	(G) the software uses a graphic (map) interface to preselect or show valid geodetic data objects	☐	
7	Geodetic data objects can be defined by:		
	(B) all users	☐	
	(S) only users with appropriate security levels	☐	
8	Tidying up of the user-defined geodetic library:		
	(B) no user-defined geodetic entities are ever allowed to be deleted		
	(S) only users with sufficiently high security privileges can modify or delete non-associated geodetic data objects in the user-defined geodetic library	☐	
9	The user-defined geodetic parameter library is secure from being updated (and thus lost) during a software update		
	(S) the user-defined geodetic library is preserved after a software version update	☐	

#	Test description	Tick if applicable	Remarks & X-references
10	When a new CRS is created, the presentation of the axes (axes order, axes direction, axes name, axes abbreviation, default unit of measure) is clear and unambiguous, allowing no confusion as to meaning of any abbreviations used in one of the following three manners: *This is particularly important for projected CRS*		
	(B) the presentation is implicit in the application's user interface and in any exported data (= Bronze score)	☐	
	(S) the presentation is explicit in the application's user interface and in any exported data (= Silver score)	☐	
	(G) the presentation fully complies with the EPSG Dataset definition of the coordinate system for similar CRS using the same conversion (map projection) method (= Gold score)	☐	
11	User documentation on the User-defined geodetic data objects is fully comprehensive, as described in Series 1000 GIGS Test Procedures. The documentation for the User-defined geodetic parameter library is consistent with the overview documentation.		
	(S) user documentation on the user-defined geodetic library is comprehensive and consistent with the overview documentation	☐	

6.5 User Interface (Series 4000)

#		Test description	Tick if applicable	Remarks & X-references
1	i)	Ordering of latitude and longitude for geographic 2D CRS		
		(E) geographic 2D CRS coordinates are ordered: latitude, longitude (NOT longitude, latitude)	☐	
		(B) geographic 2D CRS coordinates are ordered: latitude, longitude (NOT longitude, latitude)	☐	
	ii)	Ordering of latitude and longitude for geographic 3D CRS		
		(E) when supported, geographic 3D CRSs coordinate order is latitude, longitude, ellipsoidal height	☐	
		(B) when supported, geographic 3D CRS coordinates in order latitude, longitude, ellipsoidal height	☐	
	iii)	For geographic coordinates (and other angular measures) the degree representation is clear and fully labelled [e.g. decimal degrees or symbol-separated sexagesimal form (123°45′57.891″N)]		
		(E) geographic coordinate values are explicitly labelled	☐	
		(B) geographic coordinate values are not labelled	☐	
		(S) degree representation are explicitly labelled	☐	
		(G) multiple degree representations are available, each of which are explicitly labelled	☐	
	iv)	For projected CRSs, the coordinates are clearly defined and labelled and use the unambiguous terms 'easting' and 'northing'for projected CRSs that are positive to the East and North *It is important to flag that abbreviations of 'x' and 'y' without a clear definition of which one is northing and which is easting are non-compliant and should be noted as such.* *Such 'x' and 'y' abbreviations have completely opposite meanings (orientations) dependent on the specific projected CRS in use. In projected systems in standard use in about half the world, 'x' means northing and is the first coordinate in the coordinate tuple, and 'y' means easting and is the second coordinate in the coordinate tuple.*		
		(E) x and y are fixed directions in the application for all projected CRSs or all coordinate values are explictly labelled	☐	
		(B) x and y are fixed directions for all projected CRSs; labelling is implicit	☐	
		(S) coordinates are defined unambiguously and explicitly labelled	☐	
		(G) coordinates are clearly defined and labelled and follow the coordinate axes order, axes abbreviations, axes names and axes orientations as stipulated in the EPSG Dataset for each specific projected CRS.	☐	
2	i)	Labelling of geodetic data objects is consistent in all dialog boxes/windows - for pre-defined & user-defined geodetic parameter library, data operations, data import and data export functions		
		(E) labelling is consistent across application, or, when incosistent, confusion is avoided by clear labelling	☐	
		(B) labelling is not consistent across application, but confusion is avoided by clear labelling	☐	
		(S) labelling is internally consistent across application but not following EPSG terminology	☐	
		(G) labelling is consistent and compliant with EPSG terminology	☐	
	ii)	Key parameters for geodetic data object are visible to users through cursor control or sub menus in all relevant windows of the user Interface *This refers to Pre-defined & User-defined geodetic parameter library, Data Operations, Data Import and Data Export functions.*		
		(B) display of key geodetic data object parameters are inconsistent across application, but confusion is avoided by clear labelling	☐	
		(S) display of key geodetic data object parameters are internally consistent across application but not following EPSG terminology	☐	
		(G) display of key geodetic data object parameters are compliant with EPSG terminology	☐	
3		7-parameter transformation methods: users are clearly warned/advised which of the two EPSG Dataset 7-parameter transformation methods (Position Vector 7-parameter transformation and Coordinate Frame Rotation) method is used by the software *Appropriate user instruction on how to convert between these two methods is useful and if present should be noted in remarks.*		
		(-) this question is applicable - the application supports one or both 7-parameter transformation methods	☐	
		(B) warnings on these transformation methods are implicit, mentioned in documentation	☐	
		(S) warnings on these transformation methods are explicit, mentioned in user interface and user documentation	☐	
4		Consistency between user documentation and user interface		
		(E) the documentation at the user interface is consistent with the overview documentation	☐	
		(S) the documentation at the user interface is consistent with the overview documentation	☐	

6.6 Data Operations – Index sheet (Series 5000)

Note: The following table lists the data exchange formats that are considered important to the E&P industry.
Software evaluators should indicate in column ""Supported by sotware"" whether or not the relevant format is supported by the software.
For each of the formats supported by the software, the relevant Test Series worksheet (5300, 5400 or 5500) should be completed.
Copy the relevant worksheet and repeat the evaluation for each of the formats supported by the software.

	Index of formats for GIGS Test Series 5300 - Data Operations (2D seismic)	**Supported by software?**	**Remarks & X-references**
P1/84	An industry standard seismic post-plot positioning data exchange format previously established by UKOOA and currently maintained by the OGP. Current version is P1/90 but the P1/84 version is still important for legacy data		
P1/90	An industry standard seismic post-plot positioning data exchange format previously established by UKOOA and currently maintained by the OGP		
P1/11	An industry standard seismic post-plot positioning data exchange format maintained by the OGP		
SEG-P1	post-plot location data exchange format 1983, (generally superseded by OGP P1/90); the SEG-P1 format is still important with legacy data		
SEG-Y	Seismic data recording format, including position data. Version earlier than Rev 1 2002		
SEG-Y rev 1	Seismic data recording format, including position data. Current version is Rev 1 2002		
ASCII	Generic ASCII unstructured file or CSV file with 2D seismic navigation data		
	Index of formats for GIGS Test Series 5400 - Data Operations (3D seismic)		
P1/90 Q-records	P1/90 Q records are utilized for bin-centre input data in 3D seismic surveys, even though such records do not represent the final navigation bin-centre locations		
P1/11	An industry standard seismic post-plot positioning data exchange format published and maintained by the OGP		
P6/98	An industry standard format for the definition of 3D seismic binning grids and the associated data exchange, previously established by UKOOA and currently maintained by the OGP		
P6/11	An industry standard format for the definition of 3D seismic binning grids and the associated data exchange, (to be) published and maintained by the OGP; previous version is P6/98, revised in 2000		
SEG-P1	post-plot location data exchange format 1983, (generally superseded by OGP P1/90); the SEG-P1 format is still important with legacy data		
SEG-Y	Seismic data recording format, including position data; version earlier than Rev 1 2002		
SEG-Y rev 1	Seismic data recording format, including position data; current version is Rev 1 2002		
SPS r & s records	SPS format - SEG Technical Standards Committee on Ancillary Data Formats, Shell Processing Support Format for Land 3-D Surveys, 2006; current version is SPS rev 2.1		
	Index of formats for GIGS Test Series 5500 - Data Operations (Surface and Wellbore Deviation Data)		
P7/2000	An industry standard well deviation data exchange format previously established by UKOOA and currently maintained by the OGP; current version is Rev 5 - contains description of well curve data, through wellbore survey data (measured depth, inclination and azimuth) or calculated positions		
P7/11	An industry standard well deviation data exchange format (to be) published and maintained by the OGP - contains description of well curve data, through wellbore survey data (measured depth, inclination and azimuth) or calculated positions		
ASCII	Generic ASCII unstructured file or CSV file with well track data and wellbore survey data		

6.7 Data Operations (map projections) (Series 5100)

Note: This series is intended to capture the results of testing map projection functionality of the software, using the GIGS Test Dataset.
Compliance can only be claimed if all sub tests of Test 1 pass and none of the tests 2, 3 or 4 fail.
For a Silver score Test 1 (all sub tests) must pass.
For a Gold score Test 1 (all sub tests) must pass, as well as the tests 2,3 or 4, when declared applicable to the software.
No Bronze score is possible in this Test Series.

#		Test description	Tick if applicable	Remarks & X-references
1	i)	TM: Transverse Mercator conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5101	☐	
	ii)	LCC1: Lambert Conic Conformal (1 SP) conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5102	☐	
	iii)	LCC2: Lambert Conic Conformal (2 SP) conversion results:		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5103	☐	
	iv)	Stereo: Stereographic conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5104	☐	
	v)	OM-HotB: Oblique Mercator Hotine variant B conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5105	☐	
	vi)	OM-HotA: Oblique Mercator Hotine variant A conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5106	☐	
	vii)	Polyconic: American Polyconic conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5107	☐	
	viii)	Cassini: Cassini-Soldner conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5108	☐	
	ix)	Albers: Albers Equal Area conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5109	☐	
	x)	LAEA: Lambert Azimuthal Equal Area conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5110	☐	
	xi)	MercatorA: Mercator (variant A, 1SP) conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5111	☐	
	xii)	MercatorB: Mercator (variant B, 2SP) conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5112	☐	
	xiii)	TMSO: Transverse Mercator (South Orientated) conversion results		
		(-) method supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5113	☐	

#	Test description	Tick if applicable	Remarks & X-references
2	For map projection methods additional to those listed above which are supported by application (list methods in remarks):		
	(-) the application supports methods in addition to those listed in Test 1 (if yes, please specify)	☐	
	(G) pass against independent test data	☐	
3	If functionality is included in the software to compute grid convergence and scale factor		
	(-) the application contains functionality to compute grid convergence and, for conformal map projections, scale factor	☐	
	(G) evidence is supplied that these computations are correct	☐	
4	If applicable to the application, azimuth reference…		
	(-) the application contains functionality for which azimuth reference is required	☐	
	(G) …is provided with clear and fully qualified references (true north, magnetic north, grid north).	☐	

6.8 Data Operations (transformations and other conversions) (Series 5200)

Note: This series is intended to capture the results of testing transformation functionality of the software, using the GIGS Test Dataset.
Compliance can only be claimed if none of tests 1(i) through 1(viii), 2, 3(i) through 3(iii) or 4 fail.
No overall Bronze score is possible in this Test Series.
For a Silver score Test 1 must pass.
For a Gold score: none of tests 1, 2, 3 or 4 fail and a pass is required for all of tests 1(i) through 1(viii) and 3(i) through 3(iii) and if 3D seismic data is supported by the application also test 2.

#		Test description	Tick if applicable	Remarks & X-references
1	i)	Geocentric translations between geographic 2D CRSs		
		(-) method is supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5213	☐	
	ii)	PosVec: Position Vector transformations between geographic 2D CRSs		
		(-) method is supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5203	☐	
	iii)	CoordFrame: Coordinate Frame Rotation transformations between geographic 2D CRSs		
		(-) method is supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5204	☐	
	iv)	MolBad: Molodensky-Badekas transformations between geographic 2D CRSs		
		(-) method is supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5205	☐	
	v)	NADCON: NADCON transformations between geographic 2D CRSs		
		(-) method is supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5206	☐	
	vi)	NTv2: NTv2 transformations between geographic 2D CRSs		
		(-) method is supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5207	☐	
	vii)	LonRot: Longitude Rotation transformations between geographic CRSs		
		(-) method is supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5208	☐	
	viii)	VertOff: Vertical Offset transformations between vertical CRSs		
		(-) method is supported by application	☐	
		(S) pass against data in GIGS Test Procedure 5210	☐	
2		If the handling of 3D seismic bin grids is within the scope of the application: UKOOA P6 conversions		
		(-) handling of 3D seismic bin grid is within scope of application	☐	
		(S) pass against data in GIGS Test Procedure 5209	☐	
3	i)	Geocentric translations between geocentric CRSs		
		(-) CRS types and/or method are supported by application	☐	
		(G) pass against data in GIGS Test Procedure 5211	☐	
	ii)	Geocentric translations between geographic 3D CRSs		
		(-) CRS types and/or method are supported by application	☐	
		(G) pass against data in GIGS Test Procedure 5212	☐	
	iii)	GeogGeocen: Conversion between geocentric and geographic 3D CRSs		
		(-) CRS types and/or method are supported by application	☐	
		(G) pass against data in GIGS Test Procedure 5201	☐	
4		For transformation methods additional to those listed above which are supported by application (list methods in remarks)		
		(-) CRS types and/or method are supported by application	☐	
		(G) pass against independent test data	☐	

6.9 Data Operations (2D seismic) (Series 5300)

Data exchange format to which this evaluation sheet applies – P1/P11

#		Test description	Tick if applicable	Remarks & X-references
Data Exchange Format				
1		The application provides the functionality to import the chosen data exchange format		
		(E) it displays header data as help to the user during loading	☐	
		(S) it displays header data as help to the user during loading	☐	
2	i)	The application recognises the chosen data exchange format and…		
		(G) …automatically reads the header information during data import.	☐	
	ii)	The application recognises the chosen data exchange format and…		
		(G) …automatically utilises the CRS header information during data loading	☐	
Data transformation/conversion upon import				
The software correctly imports locations from a file in the currently evaluated data exchange format under each of the following scenarios				
3	i)	With full definition CRS definition records when a change of map projection is involved but with same geographic CRS		
		(S) pass against GIGS Test Procedure 5306	☐	
	ii)	With EPSG Dataset CRS code identification when a change of map projection is involved but with same geographic CRS		
		(S) pass against GIGS Test Procedure 5307 for P1/11	☐	
		(G) pass against GIGS Test Procedure 5307 for P1/84 and P1/90, as well as for P1/11	☐	
	iii)	With full definition CRS definition records in the header when a change of geodetic datum is involved, i.e. a coordinate transformation		
		(S) pass against GIGS Test Procedure 5308	☐	
	iv)	With EPSG Dataset CRS code identification in the header when a change of geodetic datum is involved		
		(S) pass against GIGS Test Procedure 5309 for P1/11	☐	
		(G) pass against GIGS Test Procedure 5309 for P1/84 and P1/90, as well as for P1/11	☐	
	v)	When a change of geographic CRS using the NADCON method is involved		
		(S) pass against GIGS Test Procedure 5324	☐	
	vi)	When a change of geographic CRS using the NTv2 method is involved		
		(S) pass against GIGS Test Procedure 5325	☐	
	vii)	When a change in projected CRS coordinate units (m/ft) is applied		
		(S) pass against GIGS Test Procedure 5310	☐	
	viii)	When geographic coordinates in grads are converted into degrees (or v.v.)		
		(G) pass against GIGS Test Procedure 5311	☐	
	ix)	When a change of vertical CRS is involved		
		(S) pass against GIGS Test Procedure 5312	☐	
	x)	When ellipsoidal heights are changed into gravity-related heights		
		(G) pass against GIGS Test Procedure 5313	☐	
	xi)	When a change in vertical CRS coordinate units (m/ft) is applied		
		(S) pass against GIGS Test Procedure 5314	☐	
Metadata capture upon import				
4		Retention of original file header		
		(E) the original data exchange file header is retained after the data is imported into a project	☐	
		(S) the original data exchange file header is retained after the data is imported into a project	☐	
5		Retention of original data records		
		(G) some sample data records from the original data exchange are retained after the data is imported into a project	☐	
6		Ability to use alias line-names		
		(E) the software allows creation of aliases for line-names	☐	
		(S) the software allows creation of aliases for line-names	☐	

#	Test description	Tick if applicable	Remarks & X-references
Import validation			
7	Data validation: shotpoint regularity		
	(G) The data are validated for excessive angle or shot point interval change. Users should be able to set a threshold of the rate of change of shot point interval or max angle of deflection	☐	
8	Data validation: spot checks		
	(G) the software has a facility for single point computational checks	☐	
9	Data validation: graphical tools		
	(G) the software displays geodetic parameters (CRS, coordinate transformation) prior to data import	☐	
10	Data management: decimating data. The software has functionality to decimate or reduce imported data to ends and, if present, bends, while maintaining geospatial integrity		
	(G) pass against GIGS Test Procedure 5315	☐	
11	Data management: decimating data:		
	(G) the software has functionality to selectively import (decimate) based on user criteria and record identifier	☐	
12	Data management aspect of line names		
	(E) a line-name limitation exists supplemented by instruction how it would affect the data management of the imported datasets.	☐	
	(B) a line-name limitation exists supplemented by instruction how it would affect the data management of the imported datasets.	☐	
	(S) no line-name limit exists in the software that will cause truncation or a typographical change to the input line names.	☐	
Seismic location data export criteria			
13	Regarding export of seismic data		
	(E) the software has functionality that supports export in the currently evaluated format	☐	
	(S) the software has functionality that supports export in the currently evaluated format	☐	
14	Visibility of CRS parameters to users at start of export. The objective is to enable users to be fully aware of the CRS parameters for the 2D seismic operations and to facilitate proper screen capture for Audit Trail and project documentation.		
	(E) the CRS definition (incl. its defining parameters) are visible to users at start of export	☐	
	(B) the CRS definition (incl. its defining parameters) are visible to users at start of export	☐	
15	Relevant metadata captured upon import (form source header files), are exported as comment records with the 2D seismic data		
	(E) relevant metadata are exported as comment records	☐	
	(S) relevant metadata are exported as comment records	☐	
Data transformation/conversion upon export *The software correctly exports locations to data exchange file in the currently evaluated format, while maintaining geospatial integrity, under each of the following scenarios:*			
16	Functionality to change the CRS upon export is not available in the software		
	(E) the original (correct) CRS definition is exported with the 2D seismic location data (no transformation capability)	☐	
	(B) the original (correct) CRS definition is exported with the 2D seismic location data (software has transformation capability, but this is not available for data export)	☐	
17 i)	When a change of geodetic datum is involved		
	(S) pass against GIGS Test Procedure 5317	☐	
ii)	When a change of geographic CRS units is involved		
	(G) The correct units (grads) are registered in the export file	☐	
iii)	When a change of map projection is involved but when the same base geographic CRS is maintained		
	(S) pass against GIGS Test Procedure 5316	☐	
iv)	When a change in projected CRS coordinate units (m/ft) is applied		
	(S) pass against GIGS Test Procedure 5318	☐	
v)	When a change of vertical CRS is involved		
	(S) pass against GIGS Test Procedure 5319	☐	

#		Test description	Tick if applicable	Remarks & X-references
Internal data transfers (this includes visualisation of a data in different CRS) *The software correctly transfers 2D seismic location data to a different project under each of the following scenarios*				
18	i)	When a change of geodetic datum is involved		
		(S) pass against GIGS Test Procedure 5321	☐	
	ii)	A unit change of geographic coordinates from degrees to grads is involved		
		(G) The correct units (grads) are passed on with the data	☐	
	iii)	A change of map projection is involved but when the same geodetic datum is maintained		
		(S) pass against GIGS Test Procedure 5320	☐	
	iv)	A change in projected CRS coordinate units (m/ft) is applied		
		(S) pass against GIGS Test Procedure 5322	☐	
	v)	A change of vertical CRS is involved.		
		(S) pass against GIGS Test Procedure 5323	☐	
2D seismic location user help documentation				
19	i)	User documentation on 2D seismic location data operations…		
		(E) …is fully comprehensive, as described in GIGS Test Series 1000	☐	
		(S) …is fully comprehensive, as described in GIGS Test Series 1000	☐	
	ii)	User documentation on 2D seismic location data operations…		
		(E) …is consistent with the overview documentation	☐	
		(S) …is consistent with the overview documentation	☐	
	iii)	The 2D seismic data operations help documentation contains detailed information on…		
		(E) …how to import and export data into/from the application the 2D seismic location data exchange formats supported	☐	
		(S) …how to import and export data into/from the application the 2D seismic location data exchange formats supported	☐	
	iv)	User documentation provides detailed information on…		
		(E) …entering metadata during the 2D seismic location data import and export process	☐	
		(S) …entering metadata during the 2D seismic location data import and export process	☐	
	v)	User documentation provides detailed information on…		
		(G) …how the seismic data import functions validate 2D seismic location data for excessive angle or shot point interval change	☐	
	vi)	User documentation provides detailed information…		
		(G) …to guide users on use of a facility to temporarily prevent transformations within the same geographic CRS (on the same datum) on the fly for regional studies, where such an option is relevant and supported by the software application	☐	

6.10 Data Operations (3D seismic) (Series 5400)

Data exchange format to which this evaluation sheet applies – P1/P11

#		Test description	Tick if applicable	Remarks & X-references
Data Exchange Format - 3D Survey Setup				
1		The software provides the functionality to import the chosen data exchange format		
		(E) it displays header data as help to the user during loading	☐	
		(S) it displays header data as help to the user during loading	☐	
2	i)	The software recognises the chosen data exchange format and…		
		(G) …automatically reads the header information during data import	☐	
	ii)	The software recognises the chosen Data Exchange Format and…		
		(G) …automatically utilises the CRS header information during data loading	☐	
3D coverage polygons				
3	i)	The software permits creation of a 3D coverage polygon…		
		(G) …for P1/90: using the Q records (or a user selected sample)	☐	
	ii)	The software permits creation of a 3D coverage polygon…		
		(G) …for P1/11, P6/98, P6/11 and SEG-Y rev 1: using the coverage descriptions	☐	
	iii)	The software permits creation of a 3D coverage polygon…		
		(G) …for SEG-Y: using horizon information from SEG-Y	☐	
	iv)	The software permits creation of a 3D coverage polygon…		
		(G) …manually based on 1 to 4 points constructed from associated azimuths, increments and bin dimensions	☐	
	iv)	The software imports 3D coverage polygons based on bin grid extent, map grid extent, geographic extent, total coverage, full fold coverage, null full fold coverage island and null coverage island		
		(G) pass against GIGS Tests Procedure 5406	☐	
	vi)	The software imports different polygons based on bin grid extent, map grid extent, geographic extent, total coverage, full fold coverage, null full fold coverage island and null coverage island when a CRS change has to be made.		
		(G) pass against GIGS Tests Procedure 5407	☐	

#		Test description	Tick if applicable	Remarks & X-references
Bin grid definition and operations				
4	i)	Bin grids are defined unambiguously, either by 3 (or 4) corner points or in accordance with P1/11, P6/11, P6/98 and SEG-Y rev 1, as follows: *This question implies that the software does not use ambiguous concepts in the definition, e.g. ""bottom left"" is associated with the origin."*		
		(E) specification by manual entry (software has no coordinate operation capability)	☐	
		(B) specification by manual entry (software does have coordinate operation capability)	☐	
		(S) the software derives the corner points of the bin grid from the data records in the data exchange file.	☐	
		(G) the software derives the definition of the bin grid in accordance with EPSG operation method 9666 from the data records in the data exchange file	☐	
	ii)	Bin position interpreter		
		(S) the software provides a calculator to allow sample conversion calculations between CRS and bin grid coordinates	☐	
	iii)	The software has the capability to execute bin grid checks as follows		
		(E) it allows checking of the rectilinear properties of the 3D coverage polygon.	☐	
		(B) it allows checking of the rectilinear properties of the 3D coverage polygon.	☐	
		(S) it allows checking of the rectilinear properties of the 3D coverage polygon and quantifies distortions	☐	
	iv)	Bin grid orthogonality capability		
		(B) the software cannot load non-orthogonal data	☐	
		(S) the software can load non-orthogonal datasets with correct geospatial representations	☐	
	v)	3D seismic data export		
		(G) the software allows all or part of the 3D seismic data to be exported with complete geospatial metadata	☐	
	vi)	Audit trail. The software…		
		(E) …retains the source format information for the original 3D seismic data after it has been merged into another project	☐	
		(S) …retains the source format information for the original 3D seismic data after it has been merged into another project	☐	
	vii)	Audit trail. The software…		
		(E) …retains the original data exchange file header after the data is imported into a project	☐	
		(S) …retains the original data exchange file header after the data is imported into a project	☐	
	viii)	Audit trail. The software…		
		(G) …, when merging datasets that utilise different CRSs, retains the relevant metadata captured upon import (from source header files)	☐	
	ix)	Audit trail. The software…		
		(G) …, when exporting a bin grid referenced to a different CRSs, the software adds the original definition of the bin grid to the metadata file.	☐	
Data Operations - Change of CRS (i.e. bin grid definition is modified to accommodate distortion)				
5	i)	Correctly transforms seismic locations to a different CRS on import		
		(S) pass against GIGS Tests Procedure 5403	☐	
	ii)	Correctly transforms seismic locations to a different CRS on export		
		(S) pass against GIGS Tests Procedure 5404	☐	
	iii)	Correctly transfers seismic location data when a CRS change has to be made		
		(S) pass against GIGS Tests Procedure 5405	☐	

#		Test description	Tick if applicable	Remarks & X-references
User help documentation for 3D seismic data				
6	i)	User documentation on 3D seismic location data operations…		
		(E) …is fully comprehensive, as described in GIGS Test Series 1000	☐	
		(S) …is fully comprehensive, as described in GIGS Test Series 1000	☐	
	ii)	User documentation on 3D seismic location data operations:		
		(E) …is consistent with the overview documentation	☐	
		(S) …is consistent with the overview documentation	☐	
	iii)	The 3D seismic data operations help documentation contains detailed information on…		
		(E) …the 3D seismic data exchange formats, which are supported for 3D seismic data import and export	☐	
		(S) …the 3D seismic data exchange formats, which are supported for 3D seismic data import and export	☐	
	iv)	The 3D seismic data operations help documentation contains detailed information on…		
		(E) …how user can extract the relevant information from the recommended data exchange formats to facilitate data loading and CRS setup/ operation within the software	☐	
		(S) …how user can extract the relevant information from the recommended data exchange formats to facilitate data loading and CRS setup/ operation within the software	☐	
	v)	User documentation provides guidance on…		
		(E) …loading of all or selected subsets of the bin centre grid locations	☐	
		(S) …loading of all or selected subsets of the bin centre grid locations	☐	
	vi)	User documentation provides guidance/workflows…		
		(E) …for validating the loading of 3D seismic positioning data	☐	
		(S) …for validating the loading of 3D seismic positioning data	☐	
	vii)	User documentation provides detailed information on…		
		(E) …entering metadata during the 3D seismic location data import and export process	☐	
		(S) …entering metadata during the 3D seismic location data import and export process	☐	
	viii)	User documentation provides detailed information/guidance on…		
		(G) …how to handle projection changes in 3D bin grids	☐	

6.11 Data Operations (Wells – Surface and Wellbore Deviation Data) (Series 5500)

Data exchange format to which this evaluation sheet applies – P7/2000

#		Test description	Tick if applicable	Remarks & X-references
Data Exchange Format - project setup				
1		The software provides the functionality to import the chosen Data Exchange format		
		(E) the software displays header data as help to the user during loading	☐	
		(S) the software displays header data as help to the user during loading	☐	
2	i)	The software recognises the chosen Data Exchange Format and…		
		(G) …automatically reads the header information during data import	☐	
	ii)	The software recognises the chosen Data Exchange Format and…		
		(G) …automatically utilises the CRS header information during data loading	☐	
3	i)	The software…		
		(S) …allows user specification of the azimuth reference	☐	
		(G) …automatically extracts the azimuth reference header information from the input file during data loading	☐	
	ii)	The software…		
		(S) …allows user specification of the depth unit of measure	☐	
		(G) …automatically extracts the depth unit of measure header information from the input file during data loading.	☐	
Data import				
4	i)	The software correctly imports the following data from a structured ASCII file (i.e NOT an industry recognised data exchange format)		
		(E) measured depth, inclination and azimuth	☐	
		(S) measured depth, inclination and azimuth	☐	
	ii)	The software correctly imports the following data from a structured ASCII file (i.e NOT an industry recognised data exchange format)		
		(E) delta X, delta Y, TVD	☐	
		(S) delta X, delta Y, TVD	☐	
	iii)	The software correctly imports the following data from a structured ASCII file (i.e NOT an industry recognised data exchange format)		
		(E) easting, northing, TVD	☐	
		(S) easting, northing, TVD	☐	
	iv)	The software correctly imports the following data from a structured ASCII file (i.e NOT an industry recognised data exchange format)		
		(G) latitude, longitude, TVD	☐	
5		The software correctly imports horizontal positions of a wellbore in geographic (latitude/longitude) coordinates		
		(E) pass against GIGS Test Procedure 5506	☐	
		(S) pass against GIGS Test Procedure 5506	☐	
6		The software correctly imports horizontal positions of a wellbore in map coordinates		
		(E) pass against GIGS Test Procedure 5507	☐	
		(S) pass against GIGS Test Procedure 5507	☐	
7		The software correctly imports well track data in latitiude, longitude and ellipsoidal height		
		(G) pass against GIGS Test Procedure 5526	☐	
8		The software correctly imports horizontal positions of a wellbore in map coordinates, converting the coordinates upon import to a different projected CRS (map projection change only)		
		(S) pass against GIGS Test Procedure 5508	☐	
9		The software correctly imports horizontal positions of a wellbore in geographic coordinates, converting the coordinates upon import to a different geographic CRS (geodetic datum change only)		
		(S) pass against GIGS Test Procedure 5509	☐	
10		The software correctly imports wellbore depth data with change of vertical CRS unit (ft/m)		
		(S) pass against GIGS Test Procedure 5517	☐	

#	Test description	Tick if applicable	Remarks & X-references
11	The software correctly calculates welltrack coordinates upon import from wellbore survey data		
	(S) pass against GIGS Test Procedure 5514	☐	
12	The software correctly transforms welltrack data and wellbore survey data from multiple wells upon import to a common vertical CRS, where the individual wells may have depths referenced to different vertical CRSs.		
	(S) pass against GIGS Test Procedure 5515	☐	
13	The software applies azimuth reference corrections for grid convergence correctly		
	(E) the software allows user specified grid convergence and corrects azimuth data accordingly	☐	
	(S) the software calculates grid convergence and corrects azimuth data accordingly	☐	
14	The software applies azimuth reference corrections for magnetic declination correctly		
	(E) the software allows user specified magnetic declination, correcting azimuth data accordingly	☐	
	(S) the software allows user specified magnetic declination, correcting azimuth data accordingly	☐	
15	The software correctly imports wellbore survey data (measured depth, inclination and azimuth)…		
	(E) …referenced to true north in northern hemisphere. Report result of GIGS Test Procedure 5510	☐	
	(S) …referenced to true north in northern hemisphere. Report result of GIGS Test Procedure 5510	☐	
16	The software correctly imports wellbore survey data (measured depth, inclination and azimuth)…		
	(E) …referenced to grid north in northern hemisphere. Report result of GIGS Test Procedure 5511	☐	
	(S) …referenced to grid north in northern hemisphere. Report result of GIGS Test Procedure 5511	☐	
17	The software correctly imports wellbore survey data (measured depth, inclination and azimuth)…		
	(E) …referenced to true north in southern hemisphere. Report result of GIGS Test Procedure 5512	☐	
	(S) …referenced to true north in southern hemisphere. Report result of GIGS Test Procedure 5512	☐	
18	The software correctly imports wellbore survey data (measured depth, inclination and azimuth)…		
	(E) …referenced to grid north in southern hemisphere. Report result of GIGS Test Procedure 5513	☐	
	(S) …referenced to grid north in southern hemisphere. Report result of GIGS Test Procedure 5513	☐	

Wellbore survey metadata (any relevant data specifying identification details of the well and the provenance of the wellbore survey)

19	i) The wellbore survey metadata…		
	(E) …is associated correctly with the wellbore to which it relates	☐	
	(S) …is associated correctly with the wellbore to which it relates	☐	
	ii) Wellbore survey header data		
	(G) the software stores original wellbore header upon data import	☐	
20	Corrections applied to wellbore data upon import…		
	(E) …are stored with the wellbore metadata	☐	
	(S) …are stored with the wellbore metadata	☐	
21	The wellbore survey data (measured depth, inclination and azimuth)…		
	(E) …is associated correctly with the wellbore to which it relates	☐	
	(S) …is associated correctly with the wellbore to which it relates	☐	

User Interface

22	The software displays the azimuth reference of the data (true, grid or magnetic) unambiguously		
	(E) the default azimuth reference is declared in documentation or help file, or is displayed unambiguously in the interface	☐	
	(B) the default azimuth reference is declared only in documentation or help file	☐	
	(S) the user interface displays azimuth reference of data in unambiguous fashion	☐	
23	The software displays the unit of measure of the depth data unambiguously		
	(E) the default unit of measure is declared only in documentation or help file, or is displayed unambiguously in the interface	☐	
	(B) the default unit of measure is declared only in documentation or help file	☐	
	(S) the user interface displays unit of measure of depth data in unambiguous fashion	☐	

#		Test description	Tick if applicable	Remarks & X-references
Well track calculation methods				
24		The well track can be calculated from the wellbore survey data in one of the following ways:		
		(E) by means of the minimum curvature method	☐	
		(S) by means of the minimum curvature method	☐	
		(G) by means of the minimum curvature method or the LMP method. The latter is particularly relevant for long reach wells.	☐	
Internal data transfers (this includes visualisation of a data in different CRS)				
25	i)	The software correctly transfers well track data under each of the following scenarios: … when a change of projected CRS is involved (change of map projection; the same base geographic CRS)		
		(G) pass against GIGS Test Procedure 5522	☐	
	ii)	…when a change of geographic CRS is involved (geodetic datum change)		
		(G) pass against GIGS Test Procedure 5523	☐	
	iii)	…when a change of projected CRS is involved that includes a different unit.		
		(G) pass against GIGS Test Procedure 5524	☐	
	iv)	…when a change of vertical CRS is involved.		
		(S) pass against GIGS Test Procedure 5525	☐	
	v)	…when a change of the well vertical reference is involved (e.g. from KB to GL)		
		(S) the software correctly converts depths to the specified well reference	☐	
Data export using data exchange formats:				
26		The software provides the functionality to export data correctly in the following formats:		
		(E) generic ASCII structured file or CSV file	☐	
		(S) generic ASCII structured file or CSV file	☐	
		(G) for P7/2000 only	☐	
27	i)	The software provides the functionality to export data correctly while…		
		(E) …preserving well header information during data export (including well surface location coordinates, vertical reference and definition of CRSs)	☐	
		(S) …preserving well header information during data export (including well surface location coordinates, vertical reference and definition of CRSs)	☐	
	ii)	…changing the projected CRS for the export file (map projection change only)		
		(G) pass against GIGS Test Procedure 5518	☐	
	iii)	…changing the geographic CRS for the export file (geodetic datum change only)		
		(G) pass against GIGS Test Procedure 5519	☐	
	iv)	…changing the projected CRS for the export file (unit of measure change only).		
		(G) pass against GIGS Test Procedure 5520	☐	
	v)	…changing the vertical CRS		
		(S) pass against GIGS Test Procedure 5521	☐	
	vi)	…a change of the well vertical reference is involved (e.g. from KB to GL)		
		(S) the software correctly converts depths to the specified well reference (any appropriate reference can be used - an example using TVDBML is given in GIGS test Procedure 5516)	☐	

#	Test description	Tick if applicable	Remarks & X-references
User documentation for Well Deviation Data			
28	User documentation on wellbore survey data operations…		
	(E) …is fully comprehensive, as described in GIGS Test Series 1000	☐	
	(S) …is fully comprehensive, as described in GIGS Test Series 1000	☐	
29	User documentation on wellbore survey data operations…		
	(E) …is consistent with the overview documentation	☐	
	(S) …is consistent with the overview documentation	☐	
30	User documentation contains detailed information on…		
	(E) …the data exchange formats and methods supported for directional well data import and export	☐	
	(S) …the data exchange formats and methods supported for directional well data import and export	☐	
31	User documentation contains detailed information on…		
	(E) …the attributes required for importing and exporting wellbore survey data or well track data and the attributes computed	☐	
	(S) …the attributes required for importing and exporting wellbore survey data or well track data and the attributes computed	☐	
32	User documentation contains detailed information on…		
	(G) …the well track calculation algorithm used and how the attributes are computed	☐	
33	User documentation contains guidelines on…		
	(G) …validating the loading of wellbore survey data	☐	

6.12 Audit Trail (Series 6000)

#		Test description	Tick if applicable	Remarks & X-references
1	i)	The audit trail contains information on…		
		(G) …who manipulated the data	☐	
	ii)	The audit trail contains information on…		
		(G) …how the data was manipulated (i.e., what operations were performed on the data and in what sequence, what are the conversions, transformations and CRS used and in what role, units of measure, etc.) *This Audit Trail information can be captured as EPSG Dataset codes or, preferably with full geodetic metadata on each operation performed and CRS utilised.*	☐	
	iii)	The audit trail contains information on…		
		(G) …what data was manipulated, specifically	☐	
	iv)	The audit trail contains information on…		
		(G) …the time and date the data was manipulated	☐	
	v)	The audit trail contains information on…		
		(G) …the version of the geoscience software	☐	
	vi)	The audit trail contains information on…		
		(G) …the path of the originating project/file	☐	
	vii)	The audit trail contains information on…		
		(G) …the path of the exported project/file	☐	
	viii)	The audit trail contains information on…		
		(G) …the path of the current project/file	☐	
2		The audit trail contents is protected against accidental or intentional modification by users and administrators. *For security reasons, it should never be possible to modify or delete an audit trail record.*		
		(G) the audit trail is 'read only'	☐	
3		The contents of the audit trail is accessible by users.		
		(G) a hardcopy version of (selected parts of) the audit trail can be generated by users	☐	
4		Export of auxiliary metadata or audit trail contents (this is particularly important for geoscience softwares that are unable to provide a full audit trail. Absence of audit trail but with presence of metadata to provide audit trail should be documented):		
		(G) all auxiliary metadata associated with a given data operation is exported along with the geoscience dataset.	☐	
5		The auxiliary metadata bridges software interfaces:		
		(G) the auxiliary metadata contains metadata relating to file management and transfers from module to module or between successive softwares.	☐	
6		The auxiliary metadata contains 'pedigree' information for the geospatial data:		
		(G) the auxiliary metadata contains, for all component data, evidence of its provenance, imported data exchange format, history and quality criteria and verification conducted; and for data export, the geospatial header data as it was output.	☐	
7		The auxiliary metadata contains information on the geodetic history of the geospatial data.		
		(G) the auxiliary metadata is automatically populated with the EPSG codes of any coordinate operations that have been applied to the data and/or the names the applied coordinate operations with their defining geodetic parameters (name & value).	☐	
8		Creation of user-specified auxiliary metadata elements:		
		(G) the software prompts the user at appropriate points in the workflow to enter the minimum required metadata to be recorded in the audit trail.	☐	
9		Audit trail records are automatically created for all mdifications of the user-defined geodetic library.		
		(G) the audit trail contains records of all user-defined geodetic data objects that are created, modified, deprecated and/or deleted (where allowed) including their defining parameters.	☐	
10		The software correctly records in the audit trail information regarding CRS upon loading a P1/90 file. Record results of GIGS Test 6001. *This applies to P1/90 with traditional CRS definition records.*		
		(G) a change of CRS upon import of a P1/90 is correctly recorded in the audit trail.	☐	
11		The software correctly records in the audit trail information regarding CRS upon loading a P1/90 file. Record results of GIGS Test 6002. *This applies to P1/90 with EPSG CRS definition records.*		
		(G) a change of CRS upon import of a P1/90 is correctly recorded in the audit trail.	☐	

#		Test description	Tick if applicable	Remarks & X-references
12	i)	The user help documentation on the audit trail…		
		(G) …is fully comprehensive, as described in GIGS Test Series 1000. The documentation for the audit trail functionality is consistent with the overview documentation. Any inconsistencies should be noted in non-compliance report.	☐	
	ii)	The user help documentation on the audit trail…		
		(G) …provides detailed information and guidance on accessing the audit trail records	☐	
	iii)	The user help documentation on the audit trail…		
		(G) …provides detailed information and guidance on printing and/or exporting the audit trail records	☐	
	iv)	The user help documentation on the audit trail…		
		(G) …complies with ISO 6709 recommendations	☐	
	v)	The user help documentation on the audit trail…		
		(G) …provides clear descriptions of any abbreviations used in the audit trail records	☐	

6.13 Deprecation (Series 7000)

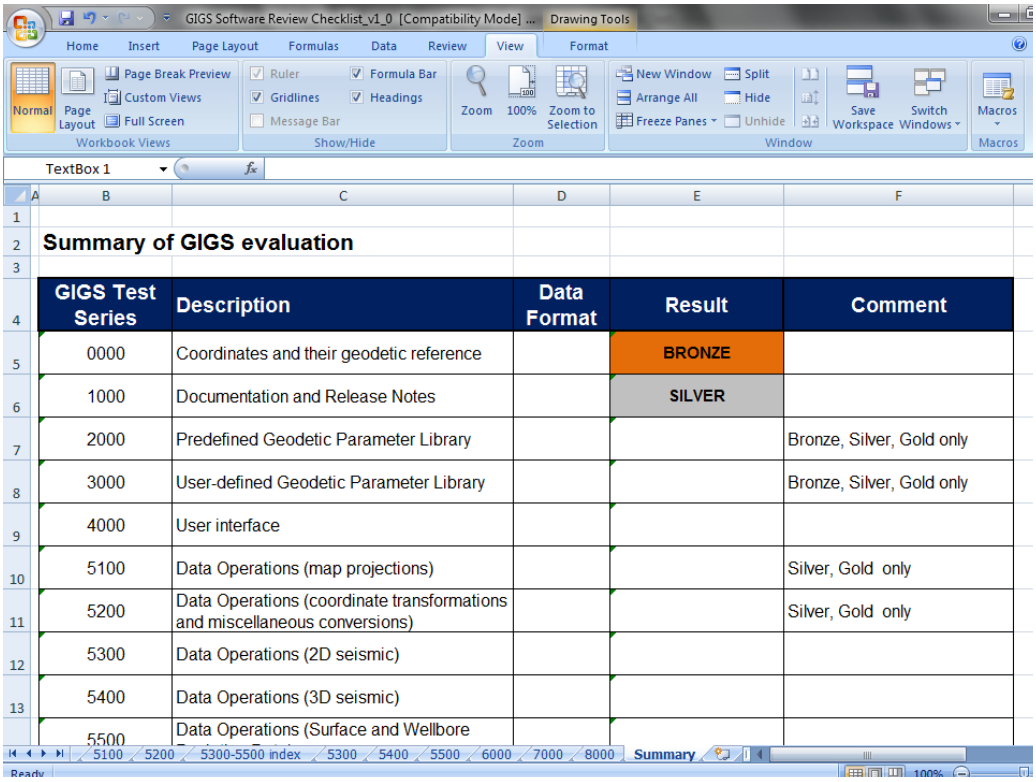
#		Test description	Tick if applicable	Remarks & X-references
1	i)	The geoscience software acknowledges the concept of deprecation in the following way:		
		(G) it does not delete or discard geodetic data records found to be in error, but rather recognises them as 'Deprecated'	☐	
	ii)	The geoscience software acknowledges the concept of deprecation in the following way:		
		(G) it recognises data with the EPSG Dataset deprecation flag. Report results of GIGS Tests Procedure 7001	☐	
	iii)	The geoscience software acknowledges the concept of deprecation in the following way:		
		(G) it differentiates between deprecated and valid CRS and coordinate operations (i.e., deprecated or valid geodetic data objects)	☐	
	iv)	The geoscience software acknowledges the concept of deprecation in the following way:		
		(G) it provides different levels of access to deprecated geodetic data objects, separately from valid geodetic data objects	☐	
2	i)	The geoscience software provides the following capabilities and functionality regarding deprecation:		
		(G) it provides capability to save and recognise deprecated pre-defined geodetic data objects provided to a specific location or with a distinct deprecation flag set.	☐	
	ii)	The geoscience software provides the following capabilities and functionality regarding deprecation:		
		(G) it does not allow any user to deprecate the software vendor's pre-defined records considered to be in error by that user	☐	
	iii)	The geoscience software provides the following capabilities and functionality regarding deprecation:		
		(G) capability to save deprecated user-defined geodetic data objects to a specific location or with a distinct deprecation flag set such that it has the capability to recognise such deprecated records.	☐	
	iv)	The geoscience software provides the following capabilities and functionality regarding deprecation:		
		(G) capability for high-security access level users to deprecate user-defined records which are found to be in error; these are then handled in the same way as all other deprecated user-defined records (# iii above)	☐	
	v)	The geoscience software provides the following capabilities and functionality regarding deprecation:		
		(G) it does not allow regular users (i.e. users with only low-security access level) to deprecate user-defined records, which that user considers to be in error	☐	
3		Users can…		
		(G) …view and print information from the deprecated records	☐	
4		The user help documentation…		
		(G) …fully describes the deprecation functionality and how it is utilised and accessed	☐	

6.14 Error Trapping (Series 8000)

#		Test description	Tick if applicable	Remarks & X-references
1	i)	Deletion, modification or change of user-defined geodetic data objects or any of their defining parameters…		
		(S) …result in strong error flags being raised, without a facility to deprecate the object	☐	
		(G) …are not allowed for geodetic objects that are associated with spatial data. Attempts to do so will result in strong error flags being raised and guidance to the user to follow a deprecation procedure	☐	
	ii)	Deprecation of geodetic data objects…		
		(G) …results in warning flags being raised stipulating the consequences of deprecation	☐	
	iii)	During creation of new geodetic data objects, including their parameters (e.g. CRS, projected CRS, coordinate transformation, etc)…		
		(S) …error flags are raised at appropriate steps when errors are made in creation of new geodetic data objects	☐	
		(G) …error flags are raised as above and an 'UNDO' facility exists to correct errors made in the definition of the geodetic object	☐	
	iv)	Attempts, made to utilise either pre-defined or user-defined geodetic data objects outside of their defined Area of Use (i.e. the geographic extent associated with their definition)…		
		(G) …result in error flags being raised	☐	
	v)	Attempts to merge datasets with different CRS…		
		(E) …result in an error flag being raised, informing the user that the datasets cannot be merged, with the reason	☐	
		(S) …result in warning messages being displayed, helping the user to complete data merge correctly	☐	
2		If the Position Vector 7-parameter transformation and/or Coordinate Frame Rotation transformation are supported…		
		(G) …clear warning messages are provided to caution the user as to which transformation method is being utilised for a given transformation and the associated dangers of using the incorrect method from that specified in the transformation itself	☐	
3		Upon import of spatial data…		
		(E) …error flag are raised when geodetic reference information (CRS definition, etc.) is missing	☐	
		(S) …error flags are raised when geodetic reference information (CRS definition, etc.) of the data is missing or inconsistent	☐	
4	i)	The user help documentation on error trapping…		
		(E) …is fully comprehensive, as described in GIGS Test Series 1000 and is consistent with overview documentation	☐	
		(S) …is fully comprehensive, as described in GIGS Test Series 1000 and is consistent with overview documentation	☐	
	ii)	The user help documentation on error trapping…		
		(E) …provides clear description of the meaning of error flags and warning messages, advising users which software functions are covered by the flags and messages	☐	
		(S) …provides clear description of the meaning of error flags and warning messages, advising users which software functions are covered by the flags and messages	☐	
	iii)	The user help documentation on error trapping…		
		(E) …is readily accessible both within the geoscience software (through windows and submenus) as well as offline as PDF files that can be addressed by the user when not logged in	☐	
		(S) …is readily accessible both within the geoscience software (through windows and submenus) as well as offline as PDF files that can be addressed by the user when not logged in	☐	

6.15 Partially-completed evaluation summary

The partially-completed evaluation summary is shown below.



Summary of GIGS evaluation

GIGS Test Series	Description	Data Format	Result	Comment
0000	Coordinates and their geodetic reference		BRONZE	
1000	Documentation and Release Notes		SILVER	
2000	Predefined Geodetic Parameter Library			Bronze, Silver, Gold only
3000	User-defined Geodetic Parameter Library			Bronze, Silver, Gold only
4000	User interface			
5100	Data Operations (map projections)			Silver, Gold only
5200	Data Operations (coordinate transformations and miscellaneous conversions)			Silver, Gold only
5300	Data Operations (2D seismic)			
5400	Data Operations (3D seismic)			
5500	Data Operations (Surface and Wellbore			

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