# **Cayman Islands Monetary Authority**

### SUMMARY OF PRIVATE SECTOR CONSULTATION AND FEEDBACK STATEMENT



## **Statement of Guidance: Internal Capital Models**

Section	Industry Comments	CIMA responses	Consequent amendments to the draft SOG
GENERAL COMMENTS			
	1. CIMA has already outlined the risk management framework in a previous statement of guidance. This statement of guidance does not reference that and the issuance of this guidance does not seem to consider the previous statement of guidance.	consider the insurers risk management framework and the risk management framework is referenced within the ICM statement of guidance. See page 4	None
	framework/system. It is used in analysing risks to determine required capital levels, therefore it	stated within the guidance that the ICM is a risk management framework. It is acknowledged in various sections that the ICM is part of the risk management framework. See Section 3.1 for	None

	3.	The Stress and Scenario testing guidance seems to offer a list of tests that should be considered at a minimum. Provide fewer examples, which in turn would place more onus on each individual reinsurer to devise appropriate tests relative to their own risks, as this will then allow enhanced benchmarking by CIMA.	The Statement of Guidance does not state that such tests should be considered at a minimum. The wording is as follows: 'Some examples of Stress and Scenario tests which may be included, but not limited to, are the following'.	None
	4.	combined, as there is duplication and repetition. Comments for items in section 6 should also be considered for section 7.	These sections should not be combined. Stress and Scenario Testing and Validation are two different and distinct processes. Validation is a review process capturing all aspects of an ICM.	None
	5.	Be consistent using 'executive management' or 'management'. Just used one or the other.	Executive management is referenced once as it is the intent of that section to specifically capture executive management.	None
	6.	Weak in the area of non-insurance risk assessment. For example, 11.7 – credit risk – there should be more layers to this; setting out consideration/process for risk assessment related to the credit worthiness of reinsurers, expected loss in cases of reinsurer default, etc.	This is captured in the definition of Credit Risk in the Glossary.	None
1. Statement of Objectives				
General comments				
2. Introduction				
General comments				
3. Use Test				

General comments			
3.1 – "The ICM, its methodologies and results, should be fully embedded within the Licensee's risk strategy and operational processes. The ICM should assist in the measurement and management of material sources of risk and be used to evaluate potential actions to mitigate unsatisfactory risk exposures. The ICM should also be used by the Licensee to better understand the alignment of exposures across different risk categories."	What is meant by "alignment of exposures"?	diversification between risks.	Amend the final sentence of Section 3.1 of the SOG to read: "The ICM should also be used by the Licensee to better understand the alignment of exposures (e.g. the interaction, correlation or diversification between risks) across different risk categories."
	2. More clarity is needed with regard to risk strategy and operational processes. How will this be evidenced/verified? Is it supposed to be documented? Will this be subjective and assessed during on-site review/inspection?	See Section 8.2 which states that 'the Authority will rely on the Licensee's existing documentation to the extent practicable'  The 'Rule-Risk Management for Insurers' covers the expectations for risk strategy and operational processes. This will be assessed as part of the ICM assessment in the first instance and thereafter through on-site inspections, meetings etc.	None
<b>3.2</b> – "The ICM should produce information that is sufficiently timely and granular in order to	Vague –what specifically do you mean by timely and granular	In this context, timely meaning current or up-to-date and granular meaning to the appropriate level of detail required for decision making.	Amend Section 3.2 of the SOG to read: "The ICM should

be used in decision making."			produce information that is sufficiently current and up-to-date. The information should also be at the appropriate level of detail required for decision making."
	2. Who would be making the decision? CIMA, the licensee, or both?	The licensee is responsible for determining the output of information from the ICM that is appropriate for use in its decision making. The Authority may seek further clarification on such determination as part of the review process.	None
<b>3.4 – "</b> The ICM should contain processes and reporting that enables the Licensee to monitor, manage and report on the individual and aggregate risks to which the Licensee is or could be exposed, as well as the interactions and dependencies between risks."	Would this form a part of the licensee's risk management framework?	·	None
<b>3.5</b> – "A broad involvement of a range of business functions should exist in the use of the ICM, including both executive management and risk management. Each business function should understand	1. Clarify that executive management would not necessarily be expected to operate the model but should be familiar with the output and its interpretation and be able to demonstrate use in management decision making. In practice only one team may operate the model	expectations for executive management.	None

how its areas of responsibility are reflected in the ICM and how past experience will impact capital requirements."	(actuarial for example) but the output will be used by various business functions.		
3.6 - "There should be an adequate recognition of the limitations of modelling processes, given the range of factors considered in management's decision making processes and the inherent limitations of ICM. The Authority would expect the ICM to be used as an input in to key management decisions; however, the ICM should not be the sole determinant of such decisions."	The ICM should consider stressed scenario's and cause management to adjust for them appropriately.	This is considered under Section 6-Stress and Scenario Test	None
3.7 - "The frequency of determination of the PCR using the ICM should be consistent with the Licensee's needs, but it must be assessed at least annually. The Board and management should also ensure that processes are in place to update the ICM to take into account changes in the Licensee's risk strategy or other business changes."	Consider adding "and other internal or external changes, such as legislative changes or economic changes."	Agree to include 'or external changes'	Amend section 3.7 to include external changes

3.9 - "All departments of the Licensee should use and rely upon the ICM. The ICM should be fully embedded within the organization which results in continuous feedback to the modelling team on the reasonableness of its results and the validity of the model	Delete "and rely upon". 'Use' is enough, because 3.6 says the ICM should not be the sole determinant.	Amend to "All departments of the Licensee should use and entirely consider the ICM. The ICM should be fully embedded within the organization which results in continuous feedback to the modelling team on the reasonableness of its results and the validity of the model inputs and critical assumptions."	Amend Section 3.9
inputs and critical assumptions."	2. Quantify "continuous feedback" e.g. daily, monthly, or quarterly.	Disagree that this should be prescribed as this will vary from one licensee to the next dependent on internal reporting frequency and timelines.	Amend Section 3.9 to add "The frequency of feedback will vary from one licensee to another."
3.11 - "The Licensee should be in a position to discuss with both the Board and the Authority the capital requirement estimated by the ICM. This should include a discussion by risk category."	The Board should 'approve' the capital requirement estimated by the ICM, not just 'be in a position to discuss'.	Agree that the Board should approve the capital requirement.	Amend the final sentence of Section 9.1 to read: "The Board must have formally approved the ICM for use within the business and must approve the reported capital requirement.
<b>3.12</b> – "In addition, the Authority expects the Licensee to have adequate governance and internal controls in place with respect to the ICM."	1. Consider replacing 'adequate' with 'appropriate', which is a better way to indicate that the governance level should meet the demands of the specific business, rather than a benchmark that is not defined herein.	Agreed	Amend 'adequate' to 'appropriate' in Section 3.12
4. Statistical Quality Test			

General comments			
4.6 — "The techniques used in the ICM should be based on rigorous actuarial and statistical techniques and be consistent with the methods of the Licensee's internal business processes. There are several different techniques that are considered appropriate (e.g. deterministic scenarios vs. stochastic modelling), and the Licensee should select the technique or techniques considered to be most appropriate based upon the Licensee's evaluation of its underlying risk exposures. The techniques selected are subject to review by the Authority."	Replace "rigorous" with "commonly used".	Rigorous will not be replaced as 'commonly used' is not the intention of this section. Rigorous means meticulous and is the expectation that is detailed here for the actuarial and statistical techniques.	None
<b>4.8</b> – "The Licensee should design the ICM to produce a probability distribution of the required risk capital rather than a single point estimate."	1. "Deterministic" is appropriate, as stated at 4.6. If that is used, it will not produce a full probability distribution; therefore this statement is contradictory to what would be allowed under 4.6.	used for certain parameters but	None
4.10a – "The data used both as inputs to the ICM and to determine parameters for the ICM should be updated annually, at a minimum, and tested for accuracy, completeness, consistency and predictive propensity, which are described below:  a. Accuracy is defined as data correctness."	1. Clarify – how is this demonstrated?	This is demonstrated by performing reconciliations between data sets.	None

<b>4.10d</b> – "d. Predictive propensity is defined as the ability to forecast future characteristics and instances within a reasonable confidence level."	1. Replace "instances" with "outcomes".	Agree to amend to "outcomes".	Amend Section 4.10d to read: "Predictive propensity is defined as the ability to forecast future characteristics and outcomes within a reasonable confidence level.
4.13 – "Processes should be in place to review all ICM inputs and assumptions for reasonableness. In addition to considering process risk, the assumptions and parameters should be determined taking into consideration parameter risk, especially for long-tail insurance classes, and data quality."	For 'inputs and assumptions'-clarify whether this would be individually or as a set of assumptions overall.	The inputs and assumptions should be assessed for reasonableness both individually and overall. For example, it would be important to check that the reserves by line of business and year were correct and not just total reserves.	Amend Section 4.13 to add: "The inputs and assumptions should be assessed for reasonableness both individually and overall."
4.14 – "Assumptions made in the ICM shall be supportable through a quantitative analysis. Licensees should be able to explain and justify each of the assumptions, taking into account the significance of the assumption, the uncertainty involved in the assumption and why the relevant alternative assumptions are not used. Licensees should establish and maintain a written explanation of the methodology used to set those assumptions."	1. This should apply to key assumptions (i.e. those to which the model output is the most sensitive).	Each assumption should be justified, but the level of justification will vary depending on the significance of the assumption.	None

4.17 – "As part of the Statistical Quality Test procedures, an analysis should be performed in order to ensure that all relevant and reasonably foreseeable risks have been incorporated into the ICM. In addition, testing should include an element of back-testing in order to compare the results of the model to the Licensee's actual historical experience."	<ol> <li>Be specific on what this analysis would involve.</li> <li>Clarify how can this be 'ensured'. Further clarity is needed.</li> </ol>	This is dependent on a licensee's methods for risk identification and how it transfers the risks to the ICM. Analysis may involve a review of the stress and scenario tests completed, checks to the risk register, documentation regarding selection of events considered, comparison to past events etc.  Mapping to risk identification methods, risk register etc.	None
	3. With regard to 'back-testing': Is the model recalibrated if historical experience is not as predicted? Need to be careful to avoid a situation where curve is fitted to out of date data. Model needs to be forward looking. An over fitted model might fit the past (including random noise) data but of little use in projecting future. Some subjectivity in including/excluding past periods where there may be unusual experience.	Agreed this is subjective and will be reviewed for reasonability and appropriateness with regard to a particular licensee's ICM.	None
5. Calibration			
General comments			
premise underlying the ICM is that the assets and liabilities should be valued on a market consistent economic basis. The ICM should be based on an economic balance sheet that reconciles to the Licensee's balance sheet used for reporting purposes."	1. Define "economic balance sheet".	This is already defined in the Glossary (page 27)	None

<b>5.3</b> – "Licensees should
fully document how the ICM is
calibrated. Model
documentation should include,
at a minimum, a list of selected
parameters, including brief
commentary on justification of
selections. This list should
include the relevant data used
to calibrate the model (e.g.
loss ratios by line of business,
where applicable). In addition
to the selected parameters, the
Licensee's historical experience
data should be provided by line
of business, as far back as this
information is available. The
documentation should also
include a definition of the
underlying balance sheet."
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1. "The documentation should also include a definition of the underlying balance sheet". Reconscile how this coincides with the requirement of use of the economic balance sheet described at 5.2.

Agreed, a definition will be included in the Glossary.

The underlying balance sheet is the balance sheet used by the licensee for financial reporting purposes (e.g. under IFRS, US GAAP etc.) whilst the economic balance sheet will be used for management purposes.

Reconciliations between the underlying balance sheet and the economic balance sheet will have to be undertaken.

Amend the Glossary to include the following definition: Underlying Balance Sheet 'The balance sheet used by the licensee for financial reporting purposes (e.g. under IFRS, US GAAP etc.)'

### 6. Stress and Scenario Test

**General comments** 

# **6.3** – "Stress testing measures loss under extreme values of the chosen variable without necessarily considering the probability of that extreme event. It is an assessment of the financial impact of changing a specific variable, without regard to the likelihood of this change. All other factors would remain a constant."

Add 'or combination' after 'chosen variable'

The Authority would typically expect stress testing to refer to one variable being changed at a time. Combinations would normally be thought of as scenario testing. We would expect to see each variable changed in turn. If the licensee feels more than one variable can change, this could be completed in addition. Amended to 'variable(s)'.

Amend Section 6.3 to read: Stress testing measures loss under extreme values of the chosen variable(s) without necessarily considering the probability of that extreme event. It is an assessment of

6.5 - "Sensitivity testing describes a similar test but under the less extreme variation. Sensitivity testing is a simple way in which to establish the extent to which the outcomes of the ICM depend on the inputs to it. Here we would expect the Licensee to vary one input assumption at a time to quantify the effect each has independently on the ICM's outputs."	1. An example where 2 assumptions are highly correlated may be useful to show the effects when the other assumptions have changed via a table. Alternatively, show the additional effect over and above previous assumption changes. As interaction terms may vary, start with most sensitive assumption for the example.	A licensee can choose which sensitivity tests they feel fits their company and their ICM.	the financial impact of changing a specific variable, without regard to the likelihood of this change. All other factors would remain a constant."  None
<b>6.11</b> – "Scenario tests often include high impact but low probability events which will allow the Licensee to prepare for specific loss events. Scenario planning is a useful tool that a company may employ to help assess the resilience of the organization to internal and external shocks."	1. See general comment for section 6. The difficulty with scenario testing is that they yield a low probability. Therefore, it is not possible to consider all of the scenarios that need to be tested and to ensure that all relevant and reasonably foreseeable risks have been incorporated into the ICM.	Scenario testing is not supposed to consider all possible scenarios. Scenario testing is to show how the capital set using the model would stand up to stresses not expected during a normal annual course of business. This point is to show that a variety of scenarios have been considered when the company decides that the capital being set is sufficient. The determination of the scenario tests should be appropriate to the nature, scale and complexity of the licensee's	Amend Section 6.11 to add: "Scenario testing is not supposed to consider all possible scenarios, but rather to show how the capital set using model would stand up to stresses not

consider all material and quantifiable risks facing a	There is a possibility of solving one change in variable here. Consider illustrating change required in	The Authority will not mandate which tests should be undertaken and therefore the approach to	expected during a normal annual course of business. The determination of the scenario tests should be appropriate to the nature, scale and complexity of the licensee's business." None
Licensee and as such, all risk categories should be included within the stress and scenario testing. The Authority will not mandate which tests should be undertaken, however they should include:  c. Reverse stress tests;"	several changes where interdependent. Reverse scenario test.	reverse stress testing may differ from one licensee to the next.	
6.17 – "The Licensee should both perform stress and scenario tests on a consistent basis year on year as well as including any additional tests which they feel are necessary given the risks the Licensee faces. The Licensee should document the differences in the results of those tests which are conducted annually should they arise."	Clarify 'consistent'. If inputs have moved to the extent that the prior year stress change seems inadequate then it may be appropriate to update the test.	The consistent basis refers to the types of tests undertaken and not the specific parameters or inputs.	None
7. Validation			

General comments			
7.1 - "The ICM should be subject to periodic validation process, with the initial validation being fully comprehensive. This includes a review of its predictive performance, an ongoing assessment of the appropriateness of material assumptions and methodologies, and a review of model output for reasonableness."	1. Duplicative of 4.17, which states: "As part of the Statistical Quality Test procedures, an analysis should be performed in order to ensure that all relevant and reasonably foreseeable risks have been incorporated into the ICM. In addition, testing should include an element of back-testing in order to compare the results of the model to the Licensee's actual historical experience"	This is not duplication. Validation is a separate process from the Statistical Quality Test.	None
7.2 - "The completion of an independent internal or external review of the development, operation and interpretation of the ICM is required prior to the Authority's review of a licensee's ICM application."	Outline who would be sufficiently knowledgeable and expectations	At a minimum, it would be expected that the persons involved would have prior ICM experience. Also see Section 7.3 whereby independent reviewers should be skilled, sufficiently knowledgeable and have prior ICM experience to challenge the ICM inputs, processes and methodology, model outputs, and its decision making.	Amend Section 7.3 to add "have prior ICM experience"
7.10 – "The validation should include an element of back-testing, which would help validate the extent to which the model generates the movements and extreme positions that have been observed in the past."	Consider defining or providing an example of what is thought of as an 'extreme position'.	This is not defined as this will vary from one licensee to the next	None
	Define `validation cycle'. Is that 3 years?	It is covered in Section 9.7 that the cycle is annually at a minimum.	None

results; the reporting to those charged with oversight; and the incorporation of any necessary changes arising from the results of the validation tests."  7.16 - "After a Licensee completes the initial validation process, it can opt to not perform a fully comprehensive validation process at every cycle, subject to no material changes to the Licensee's business risks, model inputs, methodology, and ICM governance. The Authority reserves the right to challenge the appropriateness of the scope of the validation process and the length of a validation cycle."	1. For "model inputs", Will licensee need to provide further support here as to why no significant change in assumptions?  Output  Description:	Yes, the licensee will need to provide support for assumptions used. If no significant change then the rationale should be documented. It should be noted however that this section is referring to the validation cycle.	None
8. Documentation			
General comments			
9. Model Governance			
General comments			
9.2 – "The Licensee's Board and management should have a sufficient understanding of the ICM's key elements, including the implications of its outputs and its limitations for risk and capital management decisions, and ensure that an adequate understanding of the ICM exists at appropriate levels	1. 3.2 outlines a better explanation on the expectations of management and the board. This is duplicative. 3.2 states "The ICM should produce information that is sufficiently timely and granular in order to be used in decision making."	This is not duplicative. Section 3.2 relates to the Use Test while 9.2 is from a Model Governance perspective.	None

within the Licensee's organisational structure. Evidence should be supplied about the nature and extent of training given to the Board and management."			
responsibilities relating to the ICM may be delegated to the Chief Risk Officer, or the person with responsibilities normally assumed by the Chief Risk Officer. However, the delegation of day-to-day ICM responsibilities, or use of external expertise in the development of the ICM, does not absolve the Board of its responsibility to ensure that the use of the ICM is consistent with prudent risk management and the sound and prudent conduct of the Licensee's business."	1. Is CRO a defined role? Why specify a CRO? Day to day operations of the ICM are first line activities so having a CRO responsible for the ICM is not consistent with the three lines of defense risk management model.	CRO is not a specifically defined role by the Authority. A CRO is mentioned as an example.	None
9.6 - "The Licensee should have sufficient resources, technical ability and authority to operate and maintain the ICM effectively. The Licensee's business continuity plans should include specific provisions for the backup and recovery of all critical systems needed for the continued operation and maintenance of the ICM, and succession plans should be in place to mitigate the risk of departure by personnel key to the ICM's use and development."	This shouldn't preclude the outsourcing of certain activities as all entities will not have sufficient resources to be able to build and validate an ICM.	It doesn't preclude outsourcing.	None

test and validate the ICM on an annual basis or more frequently. The Licensee should also document any subsequent changes made to the ICM, inform the Board of the Licensee about the performance of the ICM, and recommend areas needing improvement."	1. Contradicts 7.16, which states "After a Licensee completes the initial validation process, it can opt to not perform a fully comprehensive validation process at every cycle, subject to no material changes to the Licensee's business risks, model inputs, methodology, and ICM governance. The Authority reserves the right to challenge the appropriateness of the scope of the validation process and the length of a validation cycle."	7.16 provides optionality for a limited scope review to be performed.	None
9.12 – "The Licensee should document all changes made to the ICM. Major changes to the ICM or to the model change policy should be subject to approval by the Licensee's Board prior to implementation. Major changes to the ICM are also subject to review and approval by the Authority."	Clarify "Major changes", provide an example.	See Section 6.3 of the Regulatory Procedure. Major changes will be agreed between the Authority and the Licensee prior to the end of the ICM review.	None
10. Internal Controls			
General comments			
11. Risk Assessment			
General comments			
as the risk to an insurer's financial condition arising from movements in the level of volatility of market prices of assets, liabilities, and financial instruments, whether on all	1. Why incorporate a definition of market risk and not insurance risk? The heading "Long Term Insurance Risk' refers to the definition of "insurance business" which is not necessarily the same as "insurance risk".	Glossary (page 28)	None

investments as a whole (general market risk) or on an individual investment (specific market risk)."  11.7 – "The Licensee should be able to provide a detailed	Is this categorizing counterparty default risk on assets as market or another interest.	Credit risk	None
account of the approach to modelling credit risk in its ICM."	credit risk?  2. Define 'Credit Risk' and see general comment for risk section.	It is already defined in the Glossary (page 27)	None
11.8 – "The Authority recognizes that operational risk management is still a relatively new discipline and that Licensees face considerable challenges in modelling operational risk. Licensees should include operational risk within their ICM or alternatively document the approach taken to manage operational risk."	1. Define 'Operational Risk'.	It is already defined in the Glossary (page 28)	None
11.11 – "The Authority understands that Liquidity Risk may not call for an explicit capital provision like other risks, and may be assessed outside the ICM. However, to the extent liquidity risk is considered in the ICM, the Authority will aim to confirm that it is done so appropriately during the ICM review process."	1. Define 'Liquidity Risk'	It is already defined in the Glossary (page 28)	None
12 Glossary			
General comments			
"Use Test" - A test to access whether the ICM, its methodologies and results are	1. This is not a statistical test - it tests the ability to demonstrate that the model and its output is	The Authority has not implied or explicitly stated that it is a statistical test.	None

fully embedded within the Licensee's risk strategy and	considered in day-to-day business management decisions		
operational processes	2. Change "access" to "assess"	Agreed	Change the Gloassary for 'Use Test' to read: "A test to assess whether the ICM, its methodologies and results are fully embedded within the Licensee's risk strategy and operational processes."
"VaR" – "value-at-risk" means an estimate of the worst expected loss over a certain period of time at a given confidence level	1. VaR is a technique used to measure the level of risk (amount of potential loss) for a given probability over a specific time frame. The definition isn't correct. Change definition to "value-atrisk" means an estimate of the potential loss at a given confidence level over a specified period of time'	International Association of Insurance Supervisors ("IAIS") and	None