

# IAAの活動



# IAA 教育シラバスとガイドライン



## 2017 IAA EDUCATION SYLLABUS

### 1. STATISTICS

**Aim: To enable students to apply core statistical techniques to actuarial applications in insurance, pensions and emerging areas of actuarial practice.**

#### 1.1 RANDOM VARIABLES

- 1.1.1 Explain the concepts of random variable, probability distribution, distribution function, expected value, variance and higher moments. (B2)
- 1.1.2 Calculate expected values and probabilities associated with the distributions of random variables. (B3)
- 1.1.3 Define a probability generating function, a moment generating function, a cumulant generating function and cumulants, derive them in simple cases, and use them to evaluate moments. (B3)
- 1.1.4 Define basic discrete and continuous distributions and be able to apply them. (B3)
- 1.1.5 Explain the concepts of independence, jointly distributed random variables and conditional distributions, and use generating functions to establish the distribution of linear combinations of independent random variables. (B3)
- 1.1.6 Explain and apply the concepts of conditional expectation and compound distribution. (B3)

#### 1.2 STATISTICAL INFERENCE

- 1.2.1 State and apply the central limit theorem. (B3)
- 1.2.2 Explain the concepts of random sampling, statistical inference and sampling distribution, and state and use basic sampling distributions. (B3)
- 1.2.3 Describe the main methods of estimation and the main properties of estimators, and apply them. (B3)
- 1.2.4 Construct confidence intervals for unknown parameters. (C3)
- 1.2.5 Test hypotheses. (C3)
- 1.2.6 Estimate empirical survival and loss distributions, for example using:
  - a) Kaplan-Meier estimator, including approximations for large data sets
  - b) Nelson Aalen estimator
  - c) Cox proportional hazards
  - d) Kernel density estimators. (C3)
- 1.2.7 Estimate transition intensities depending on age, exactly or using large sample approximations. (C3)



## 2017 IAA EDUCATION GUIDELINES

1. An IAA Education Syllabus and Guidelines were approved by the IAA Council at its meeting in Birmingham, England on 6 June 1998. This version of the Guidelines and an updated Syllabus were approved by Council in October 2017 and replace the 2012 updated documents.
2. As part of the full membership requirements of the IAA, associations must have education requirements which are at least equivalent to the Syllabus (taken in conjunction with these Education Guidelines). The objective is that all students will have completed a compliant education syllabus on becoming full members.

### Framework

3. All associations are asked to ensure that all their fully qualified actuaries are admitted through education processes that meet the Education Syllabus and Guidelines. The IAA through the Education Committee would be pleased to work with associations to help them achieve the IAA Education Syllabus and Guidelines. The Secretariat can arrange contact with the Education Committee.
4. Cross recognition of qualifications is an association decision. Compliance by an association with the IAA Education Syllabus and Guidelines will not by itself achieve cross recognition of qualifications.
5. The criteria for being a full member of an IAA Full Member Association are defined by the association; however, such members who began their studies after the date the association became a Full Member of the IAA must have completed a set of education requirements that satisfy the IAA Education Syllabus and Guidelines. The requirements may be those in force at the time the member started their studies or any later version.

### Mathematical Background

6. The mathematical foundation for anyone entering the actuarial profession is very important, as many topics require a deep knowledge of a number of mathematical techniques. The Appendix to the Syllabus lists an example of the mathematical background expected for those commencing actuarial studies. However, more in-depth mathematical studies are implicit in the requirement to demonstrate an understanding of the models and techniques covered by the Syllabus and may be necessary in structuring an actuarial program.

[https://www.actuaries.org/IAA/Documents/CMTE\\_EDUC/Documents/2017\\_IAA\\_Education\\_Syllabus.pdf](https://www.actuaries.org/IAA/Documents/CMTE_EDUC/Documents/2017_IAA_Education_Syllabus.pdf)

[https://www.actuaries.org/IAA/Documents/CMTE\\_EDUC/Documents/2017\\_IAA\\_Education\\_Guidelines.pdf](https://www.actuaries.org/IAA/Documents/CMTE_EDUC/Documents/2017_IAA_Education_Guidelines.pdf)



## 2017 シラバス改訂案のポイント

- 学習分野としてデータとシステムの追加。
- コミュニケーション、意思決定等も含めたプロフェッショナリズムの拡充。
- 基礎として必要な数学の知識を付録として整理。



# シラバス改訂案の学習分野

1. 統計学 (Statistics)
  2. 経済学 (Economics)
  3. ファイナンス (Finance)
  4. 金融システム (Financial Systems)
  5. 資産 (Assets)
  6. データとシステム (Data and Systems)
  7. アクチュアリアル・モデル (Actuarial Model)
  8. アクチュアリアル・リスクマネジメント (Actuarial Risk Management)
  9. 個人としての行為とアクチュアリー専門職としての行為 (Personal and Actuarial Professional Practice)
- 付録 基礎数学 (Foundation Mathematics)



## シラバス改訂案のポイント

- 学習分野(大項目)・トピック(中項目)・サブトピック(小項目)で構成。
- 保険・年金といった特定分野ではなく、可能な限り一般的(generic)な文脈での記述。
- 詳細なサブトピックの記載と各サブトピックに対しブルームの分類法に基づく学習深度の例示。



## 確率と数理統計学

## 旧シラバス

ねらい: 確率と数理統計学に関する基礎知識を養う

内容:

- 確率の概念
- 確率変数とその性質
- 推定法とその性質
- 相関関係と回帰分析
- 仮説検定と信頼区間
- データ解析

## 1 統計学 } 学習分野

### 1.1 確率変数 } トピック

#### サブトピック

1.1.1 確率変数、確率分布、分布関数、期待値、分散および高次のモーメントの概念を説明する。(B2)

1.1.2 確率変数の分布に関わる期待値と確率を計算する。(B3)

1.1.3 確率母関数、積率母関数、キュムラント母関数およびキュムラントを定義し、簡単な場合において導出し、それを用いて、モーメントを評価する。(B3)

1.1.4 基礎的な離散分布と連続分布を定義し、応用できるようにする。(B3)

1.1.5 独立性、同時確率変数および条件付分布の概念を説明し、母関数を用いて独立確率変数の線形結合の分布を作る。(B3)

1.1.6 条件付期待値と複合分布の概念を説明し、応用する。(B3)

# 知識レベルと深度の明示ー改訂版ブルームの分類法

認知過程次元

動詞	1 記憶	2 理解	3 応用	4 分析	5 評価	6 創造
目的語	認識する、 思い出す	解釈する、 実証する、 分類する、 要約する、 推測する、 比較する、 説明する	実行する、 実施する	区別する、 系統立てる、 原因を特定 する	確認する、 批評する	生成する、 計画する、 生産する
A 事実に 関する知識	<b>A1</b>	<b>A2</b>	<b>A3</b>	<b>A4</b>	<b>A5</b>	<b>A6</b>
B 概念に 関する知識	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>
C 手続きに 関する知識	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>	<b>C6</b>
D メタ認知的 知識	<b>D1</b>	<b>D2</b>	<b>D3</b>	<b>D4</b>	<b>D5</b>	<b>D6</b>

知識次元



## 6. データとシステム

### 6.2 データ解析

6.2.1 探索的データ解析の目的を記述する。(B2)

6.2.2 適切なツールを用い、ふさわしい要約統計量を計算し、探索的なデータ視覚化を試みる。(C4)

6.2.3 主成分分析を用い、複雑なデータセットの次元を削減する。(C4)

6.2.4 コンピューターパッケージを用い、統計的な分布をデータセットに当てはめ、適切な適合度指標を計算する。(C4)

6.2.5 コンピューターパッケージを用い、単純線形回帰モデルあるいは重線形回帰モデルをデータセットに当てはめ、結果を解釈する。(C4)

6.2.6 コンピューターパッケージを用い、生存モデルをデータセットに当てはめ、結果を解釈する。(C4)

6.2.7 コンピューターパッケージを用い、一般線形モデルをデータセットに当てはめ、出力結果を解釈する。(C4)



## シラバス改訂案に対する賛成論

- 環境変化に対応したシラバスである。
- 将来アクチュアリーに必要となるスキルに対応している。
- アクチュアリーの伝統的な活動分野(保険・年金)に縛られたシラバスではなく、今後の活動分野の拡大に適している。
- 記載が詳細となり、深度も細かく指定されていることから、各国の試験教育制度の設計や評価に有用。



## シラバス改訂案に対する反対論・慎重論

- 深度を細かく指定するなど、細部が詳細に記載され過ぎているので、全体を最低要件とするのではなく、各国での柔軟な取扱を認めるべき。
  - 大学のコース修了をアクチュアリー資格の認定要件としている国では、「データとシステム」「コミュニケーション」などは対応困難(大学にカリキュラムを変えてもらうのは大変困難)。
  - 特定の実務分野に特化した組織(CAS 等)もシラバスの柔軟な取扱の必要性が高い。
- ⇒ シラバスの内容そのものよりも、シラバスの導入・運営方法に対する懸念・慎重論。



# プロフェッショナリズム ガイドライン

## PG1 — Principles of Professionalism



### PG1 - Principles of Professionalism

#### 1. Introduction

Professionalism for the actuarial profession means:

- the application of specialist actuarial knowledge and expertise;
- the demonstration of ethical behaviour, especially in doing actuarial work; and
- the actuary's accountability to a professional actuarial association or similar professional oversight organisation on the basis of a code of conduct.

The distinguishing feature of a profession that sets it apart from a trade, a craft, a guild or a syndicate is the overriding interest of the individual professional in the public well-being.<sup>1</sup>

This definition of professionalism is derived from the following high-level principles of professionalism, which are discussed in detail in this report:

- A. Knowledge and expertise
- B. Values and behaviour
- C. Professional accountability

These principles are discussed below.

#### 2. Principle A: Knowledge and Expertise

*"An actuary shall perform professional services only if competent and appropriately experienced to do so".*

This principle of Knowledge and Expertise is supported by the following elements:

- Specialist knowledge
- Professional communication
- Required education
- Continuing professional development

#### 2.1. Specialist knowledge

The existence of a distinct actuarial profession globally is a result of actuaries' specialist knowledge and expertise.

An actuary's clients may include governments, community organizations, funds, industries, businesses and individuals.

<sup>1</sup>Source: Esley, W. (1989) The Challenge of Professionalism. Keynote address at the Centenary Celebrations of the Actuarial Profession in North America, June 1989, Washington D.C.  
<sup>2</sup>Source: IAA Internal Regulations 2.2.2 (a) (iv)

## PG2 — Principles in relation to the Governance of International Actuarial Work



### PG2 - Principles in relation to the Governance of International Actuarial Work

This paper has been prepared by the IAA Professionalism Committee for information to assist Member Associations in this increasingly important area. It is not a model standard, nor is any change to associations' codes of conduct expected at the time of writing. This paper may also be of interest to individual actuaries undertaking International Actuarial Work.

#### 1. Definition of "International Actuarial Work"

- 1.1 International Actuarial Work is defined as work that is under the jurisdiction or regulation of one country, but is carried out by an actuary whose principal jurisdiction of practice or the jurisdiction of their professional membership is in a different country.
- 1.2 The "governance" of International Actuarial Work refers to the regulation and supervision of the actuary's conduct and work by member associations of the International Actuarial Association (IAA).
- 1.3 International Actuarial Work is broadly therefore actuarial work in relation to which the law/standards/regulatory frameworks of more than one country are relevant and material. More specifically, it is taken to include 'actuarial work'<sup>1</sup> in relation to which the legal/regulatory requirements of more than one legal jurisdiction or IAA member association<sup>2</sup> are relevant and material.
- 1.4 The following are a set of principles that might be applied by IAA member associations, with a view to avoiding or addressing the potential for inconsistency, duplication or gaps in relation to the governance of International Actuarial Work.

#### 2. Proposed Principles

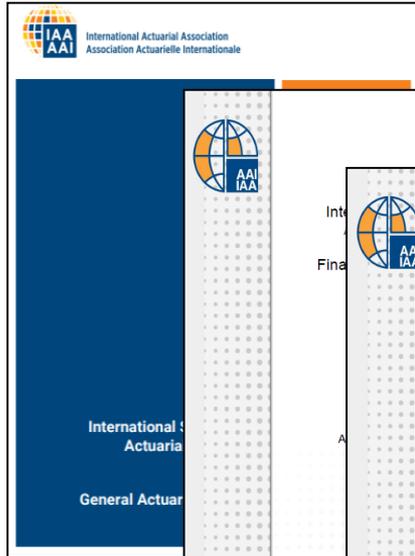
##### 2.1 Qualification, Codes and Standards

- 2.1.1 Adherence to Codes of Conduct helps to ensure that actuaries are competent to undertake work for which they are responsible, and have an appropriate understanding of relevant legal and regulatory requirements applicable to them and to that work.

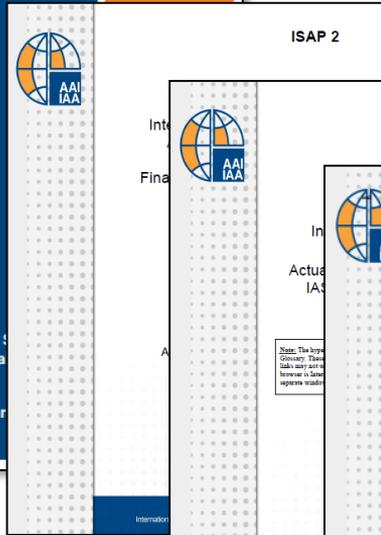
<sup>1</sup> 'Actuarial work' is assumed in this context to be defined broadly, to include any work done by members of IAA associations in their capacity as actuaries, including work done for the purposes of providing 'Actuarial Services', as defined in ISAP 1.  
<sup>2</sup> It is recognized that the regulatory jurisdiction of IAA member associations will usually arise from membership, and may not necessarily or primarily depend upon geographic/territorial considerations. Equally, it is recognized that in certain geographic territories there may be more than one IAA body which has jurisdiction. It is envisaged that the principles set out in this paper might, according to the circumstances, also be relevant in that context i.e. where there is more than one relevant legal or regulatory framework operating within a single geographic area or territory.



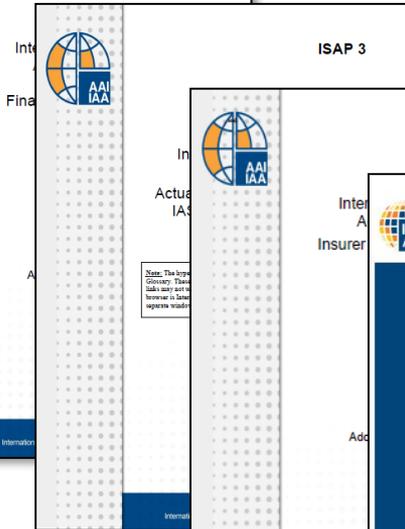
# モデル実務基準 (ISAP : International Standards of Actuarial Practice)



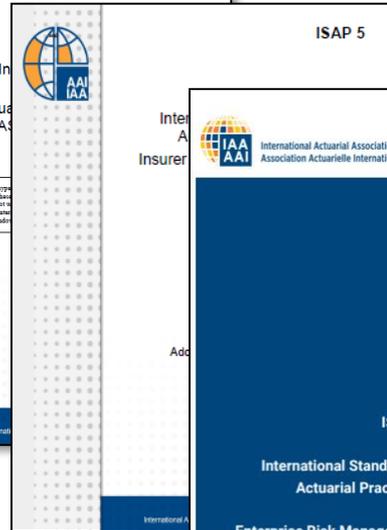
**ISAP1** (*General Actuarial Practice*)



**ISAP2** (*Financial Analysis of Social Security Programs*)



**ISAP3** (*IAS 19 Employee Benefits*)



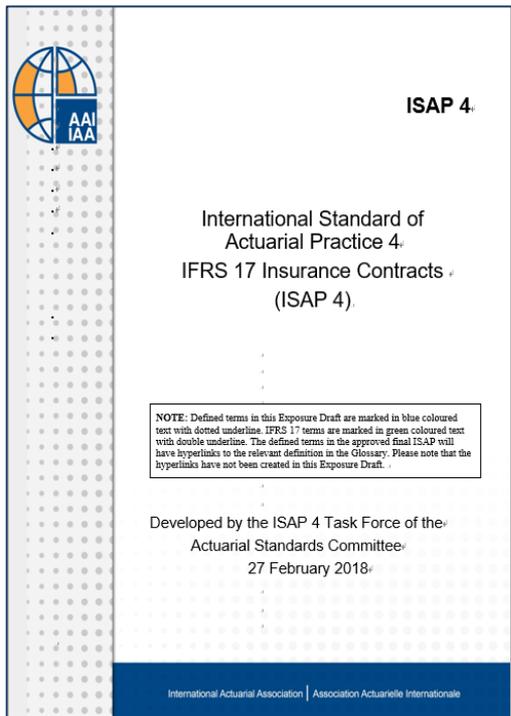
**ISAP5** (*Insurer Enterprise Risk Models*)



**ISAP6** (*ISAP 6 – Enterprise Risk Management Programs and IAIS Insurance Core Principles*)



# 現在検討中のモデル実務基準



## ISAP 4 – IFRS 17 Insurance Contracts

**ISAP 7** – “Current estimates” and other matters in relation to the IAIS capital standards (Temporarily Suspended)



## IAAのパートナー、オブザーバー





## その他の関係機関





# パブリックステートメント (2017 - 2018)

## 2018

- [2018-03-28 IAA Comments on the IPSASB Exposure Draft 63 \(ED 63\) on Social Benefits](#)
- [2018-02-15 IAA Response to IAIS Consultation on Activities-Based Approach to Systemic Risk](#)
- [2018-01-31 Response to IAIS Consultation on Revised Insurance Core Principles \(ICPs\) 15 and 16](#)

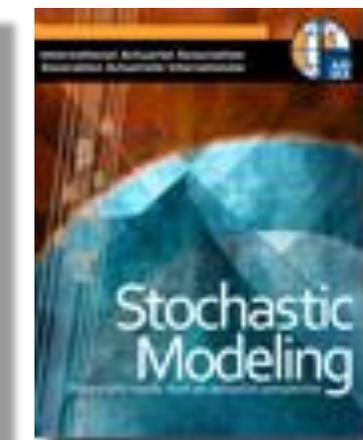
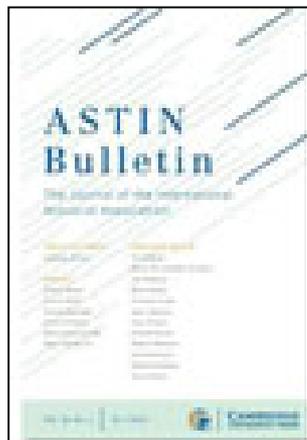
## 2017

- [2017-09-20 IAA response to EU strategy on sustainable finance - HLEG Interim Report](#)
- [2017-06-01 Response to IAIS Consultation on Revised Insurance Core Principles \(ICPs\) and ComFrame material integrated with ICPs](#)
  - [Comments for ICPs 3 and 25](#)
  - [Comments for ICPs 5, 7, and 8](#)
  - [Comments for ICPs 9 and 10](#)
  - [Comments for ICP 12](#)
- [2017-02-10 Response to TCFD Consultation on Draft Recommendations on Climate Related Financial Risk Disclosures](#)
- [2017-01-20 Comments on IAIS Draft Stakeholder Engagement Plan](#)

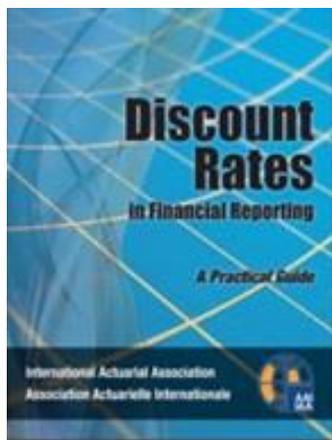


## 出版等

The ASTIN Bulletin -  
The Journal of the IAA



Stochastic Modeling —  
Theory and Reality  
from an Actuarial  
Perspective



Discount Rates in  
Financial Reporting -  
A Practical Guide



IAA Risk Book

Risk Adjustments  
for Insurance  
Contracts under  
IFRS 17



これからのIAA



## 組織改革の目的

- 重複した活動と複雑な構造の解消 (Eliminate redundancy and complexity)
- 会員サポートの強化 (Strengthen Member Support)
- 執行委員会の機能向上 (Enhance the function of EC)
- 正会員組織との関係強化 (Strengthen Engagement of FMAs)



**Vision:** アクチュアリー専門職が、リスクならびにフィナンシャル・セキュリティの分野において、主要な専門家であると世界中で認識され、社会の福祉に貢献する

### Mission

- 国際的な利害関係者へ情報提供を行うとともに影響力を持つ (Inform and **Influence** global stakeholders)
- アクチュアリー専門職の評判を確かなものとする (**Assure** the reputation of the profession)
- アクチュアリー専門職の能力・適性を向上する (**Advance** the competency of the profession)

国際機関との関係

専門職の振興

能力の開発

戦略目標



# 新しいIAA組織を検討するための指針としての戦略目標 (Strategic Objectives)

## **Influence: Supranational Relationships**

Develop relationships with key supranational institutions, providing actuarial expertise on issues of relevance in global forums.

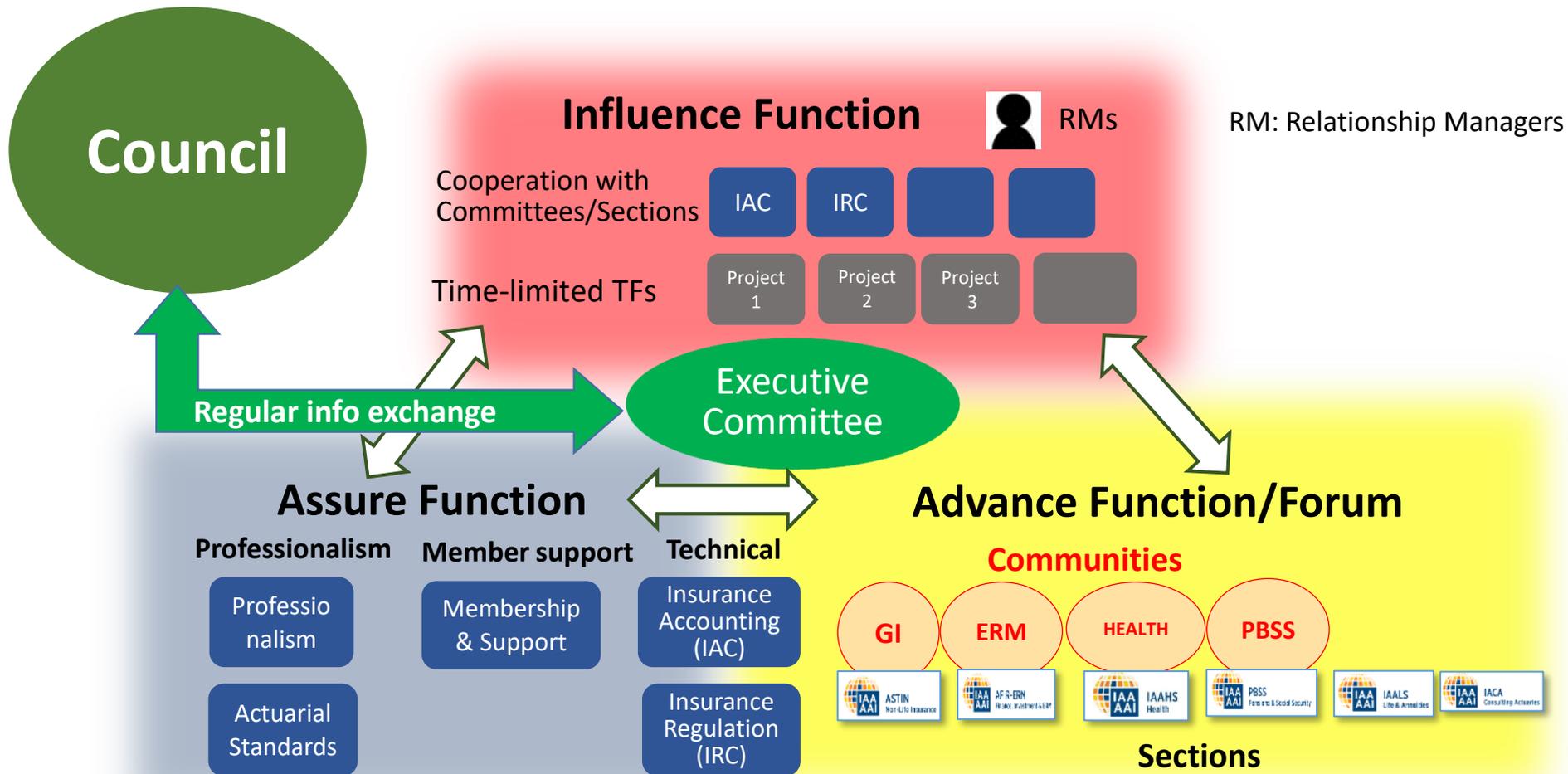
## **Assure: Promotion of the Profession**

Support the development of the actuarial profession worldwide and promote appropriate professional/education standards through Member Associations.

## **Advance: Development of Competence**

Promote the advancement of scientific knowledge and the skills of the actuarial profession.

# 2018.11 メキシコシティ会議で提案された組織改革のたたき台





## 今後の予定

- メキシコシティ会議のカウンシルで組織改革のタスクフォースの立ち上げが提案され、昨年12月に執行委員会（EC）の下、14のFMAをメンバーとする “IAA Renewal Task Force” が結成された
- 今年3月に予定されているタスクフォースのレポートを受けて、ECで議論の上、5月のワシントン会議のカウンシルで組織改革の方向性を議論
- 11月の東京会議で組織改革の決議を目指す

ご清聴ありがとうございました

[www.actuaries.org](http://www.actuaries.org)

Moving the profession forward internationally