



MoSes U.S. Life Modeling Suite

Advanced financial models for U.S. life insurance
and annuity products

MoSes U.S. Life Modeling Suite

Historically, actuarial modeling systems have not been able to adequately project the income statement and balance sheet implications under U.S. statutory, principle-based and GAAP methodologies. Recent market volatility and statutory regulatory requirements, such as VACARVM, RBC C3 Phase III and the pending VM-20, make it clear that more sophisticated modeling, including nested stochastic processing, is required.

To help U.S. life insurers and annuity writers meet these requirements, Towers Watson is pleased to offer the MoSes U.S. Life Modeling Suite (USLMS), including financial modeling applications for life insurance and annuity products. USLMS calculates both point-in-time and projected statutory and GAAP results using on-the-fly calculations. The applications support nested stochastic inner-loop valuations, as shown in the figure. USLMS can process asset/liability interactions in both inner and outer loops for more realistic results than other simplified approaches. It uses new calculation techniques developed by Towers Watson consultants and software engineers and successfully tested in client production applications.

USLMS applications

- **Fixed annuity** — Models fund-driven annuity products that have no separate account funds and are not indexed. As with all of our fund-driven product models, dynamic crediting strategies and policyholder behavior are supported.
- **Fixed indexed annuity** — Calculates a fund growth rate from index values during a specified interest crediting period, while a separate contract value is maintained by crediting interest at the guaranteed rate. Benefits are paid based on the

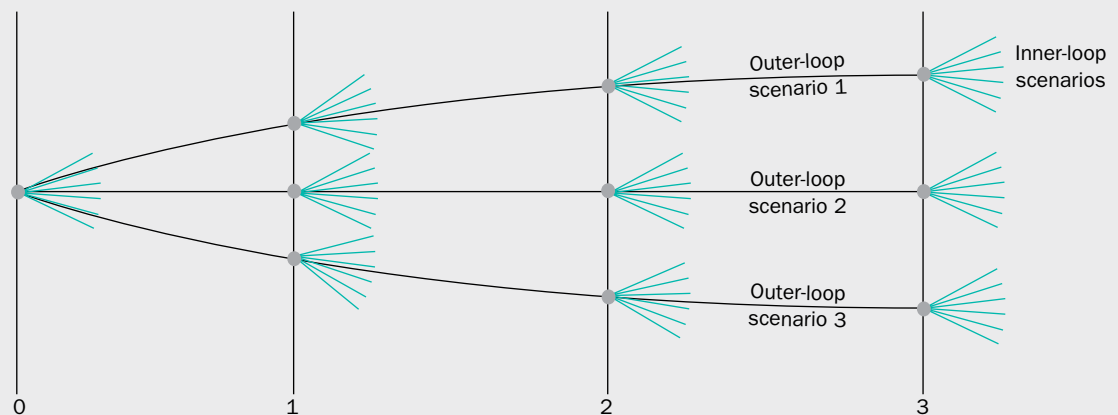
fund value, cash value or the greater of the two. Guaranteed minimum withdrawal benefit (GMWB) product features are supported.

- **Variable annuity (VA)** — Provides for statutory and GAAP valuation, cell pricing, portfolio pricing and portfolio modeling of variable annuity products. Portfolio modeling may be performed with or without assets. All four major GMxB benefit types are available, with the ability to mix or match benefit types on each model point as desired. VA subaccounts may be linked to general account assets, represent a dollar cost averaging (DCA) fund or be linked to return of an index included in a scenario file. Supports annual inner-loop valuations.
- **Term life** — Supports increasing, decreasing, renewable, level and return-of-premium term product features.
- **Universal life (UL)** — Offers general account flexible premium UL product designs, both with and without a secondary guarantee. Frasierization functionality supporting joint life product designs is included, along with dynamic premium, and lapse and crediting rate functionality, applicable to both UL products with and without a secondary guarantee. The secondary guarantee functionality supports a broad range of secondary guarantee designs, including stipulated level premium, ART and shadow fund designs with premium catch-up provisions. Includes secondary guarantee reserving calculations in accordance with Regulation XXX and AG38. Gross premium reserve functionality utilizing the nested stochastic inner-loop functionality of USLMS is also included and can be used in a variety of business situations.
- **Permanent life** — Will model par and nonpar whole life. Available later in 2011.

“USLMS calculates both point-in-time and projected statutory and GAAP results using on-the-fly calculations.”

Accurate modeling requires nested stochastic calculations throughout the projection

- Outer loops — Experience scenarios branching from the projection date
- Inner loops — Valuation scenarios beginning at various dates along each outer-loop path



- **Assets** — While the other USLMS product applications provide basic asset functionality, this companion application, distributed with the others, provides additional functionality that can be imported into those applications according to your requirements. Additional functionality includes calculations for bonds, mortgages, securitized assets, interest rate derivatives, equities, real estate, equity index options and externally projected assets, as well as portfolio investment and disinvestment processing.

General application features include:

- Pricing, projection and valuation capabilities
- Principle-based approach (PBA) reserves and capital under the standard scenario and stochastic CTE calculations under current principle-based guidelines, including VACARVM, RBC C3 Phase III and VM-20
- On-the-fly GAAP valuations with dynamic DAC unlocking and liability revaluations
 - SFAS 97 retrospective deposit method
 - SOP 03-1 additional liability
 - SFAS 133/157 liability
- Support for inner-loop asset processing, including modeling specific assets or using approximation methods
- Enhanced distribution of nested inner-loop valuations to take greater advantage of grid computing for faster results
- On-the-fly economic scenario generation, both real-world and risk-neutral, using the standard format developed by the Society of Actuaries
- A sophisticated and flexible Excel-based reporting tool that greatly assists validation and analysis capabilities of the system

Hedging cash flows and asset values from any hedging projection system, including the MoSes Variable Annuity Hedging Application, can be included in projections and in PBA and GAAP valuations.

Clients have the flexibility to change and extend these applications for company-specific products and practices. The standard versions of these applications are supported and maintained by Towers Watson. Your authorized users will be able to integrate future enhancements made by Towers Watson into their customized applications using standard MoSes features for comparing and merging financial models.

The USLMS applications are compatible with MoSes release 6.4 and higher. These applications can run in a 64-bit environment with MoSes HPC

(high-performance computing), which provides an exponential increase in memory available to run your models. USLMS applications are also compatible with the RiskAgility enterprise financial modeling platform for enhanced data management, scheduling and audit capabilities in a controlled technology environment.

Get Ready for Principle-Based Approaches Now

Through MoSes USLMS applications, companies can use proven calculation methods with greater accuracy and precision than ever before to provide financial analytics required by regulators, rating agencies and internal management. The result: risk and financial information that you can trust to help run your business.

We Leverage Our Experience to Bring You Innovative Solutions

Towers Watson consultants are active in committees and workgroups of the American Academy of Actuaries and Society of Actuaries, and have worked extensively with clients to provide financial reporting advisory services. Working with our software experts, these industry leaders have leveraged their experience and knowledge to develop innovative new MoSes financial modeling applications for the U.S.

Contact any of the Towers Watson professionals below for more information about the MoSes U.S. Life Modeling Suite.

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About Towers Watson

Towers Watson is a leading global professional services company that helps organizations improve performance through effective people, risk and financial management. With 14,000 associates around the world, we offer solutions in the areas of employee benefits, talent management, rewards, and risk and capital management.

Towers Watson is the world's largest provider of actuarial software. We combine the systems expertise of our software professionals with the actuarial knowledge and thought leadership of our insurance consulting business to develop solutions that help clients measure value, manage risk and safeguard solvency.

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