AIR Fund Designation Service

HIGHLIGHTS

- Maximize profit potential and minimize earnings volatility
- Make informed allocation decisions using AIR's probabilistic catalog
- Set customized designation criteria
- Choose level of exposure based on risk tolerance
- Use the historical information of every policyholder in decision-making
- Benefit from the support of AIR's crop insurance team throughout the year

AIR's Fund Designation Service provides clients with optimized designation alternatives from which they can choose the option that best fits their risk-return target. The service uses the 10,000-event weather-based, spatially correlated, price volatility–adjusted stochastic catalog from AIR's U.S. MPCI model and the Insured Producer Performance (IPP) Score to rank and sort policies based on their estimated risk level. Several risk metrics, including probability of loss, mean loss ratio, and 100-year return loss ratio, are calculated from the catalog and used for risk assessment of individual insurance policies. AIR modelers apply various retention levels to develop multiple fund designation strategies from which the best alternatives—those giving the lowest potential risk for a target expected return—are available to clients.

Because it is impossible to forecast the yield or price outcome for the next growing season at the time of the fund designation deadline, the best approach is a probabilistic one. AIR calculates 10,000 stochastic yield and price outcomes, or events, each of which are equally likely to occur during the next growing season. The stochastic events are based on the current climate, geographically correlated, and trended to current levels of crop technology and farmer skill.

The probabilistic fund designation service provided by AIR is the only method that accounts for geographical crop portfolio diversification and full treatment of uncertainty.

The AIR Fund Designation Service offers you alternative strategies with varying profit-potential/risk-of-loss choices. AIR has a proven track record of fund designation strategies that have higher expected gain and lower risk of loss than crop insurers can obtain using traditional actuarial-based models (see "Industry Benchmarking" at the end of this brochure). All the incremental profit resulting from the AIR Fund Designation Service is pure profit—subject only to taxes—with no additional administrative and operational expenses or Standard Reinsurance Agreement (SRA) co-insurance.

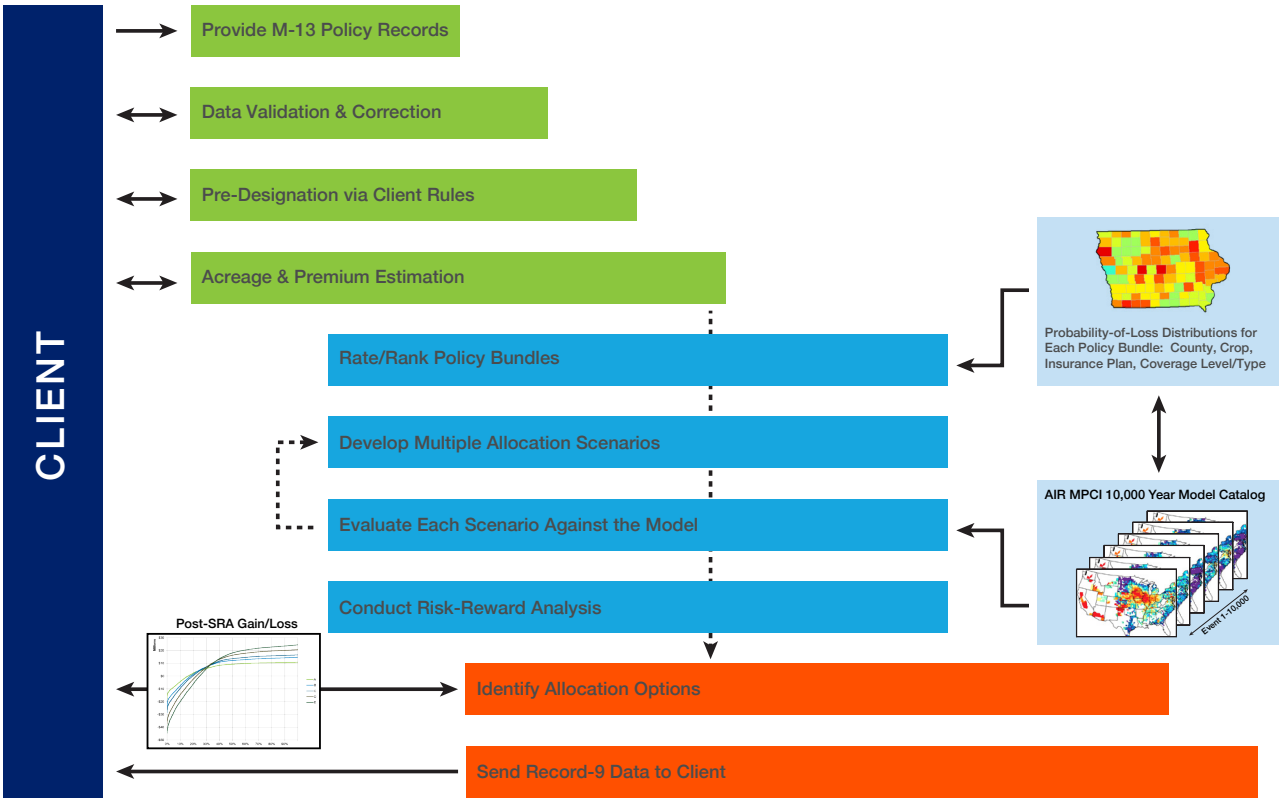
Fund Designation Scope of Service

An AIR fund designation includes three major steps, each spanning a wide breadth of services. The entire process, which is detailed below, usually takes five to seven business days.

Step 1: Data Preparation and Premium Estimation
The first step is to validate policy data and estimate the premium for every policy in the client's book. The calculated premiums are used in Step 2 to estimate expected gains/losses for each allocation strategy.

(Continued on next page)

AIR



AIR's Fund Designation Service is a 10-step process.

M-13 Policy Records

AIR provides the client with a passcode to log into a secure File Transfer Protocol (FTP) site to upload M-13 Policy Records (i.e., p09, p10, p11, p14, p15, p15a). AIR modelers discuss the sales closing date deadlines with the client and agree on the timing of deliverables.

Data Validation and Correction

AIR checks the data in the M-13 records for accuracy and formatting to ensure it is consistent with RMA requirements.

Pre-Designation via Client Rules

For added flexibility, the AIR Fund Designation Service allows clients to provide a range of desired retention levels or set their preferred pre-designation criteria. The retention percentage can be provided at the state level or for the entire book of business. Any pre-designation targets are considered when the designation strategies are developed.

Acreage and Premium Estimation

After validating the M-13 data, AIR runs acreage and premium estimators. The acreage estimator uses logistic regression on historical planting information of each individual policy in the client book (from records p15 and p15a) to estimate next year's planted crop and acreage. The acreage estimator uses the historical planting records to estimate whether rotation planting will be adopted by each policyholder next year. The client's historical book (from record p11) is then used to estimate the unit structure for every registered policy. Finally, AIR's detailed premium estimator is run on each policy in the book to estimate premiums. AIR's premium estimator reads updated premium rates and policy conditions from the current year Actuarial Document Master and calculates the premium based on the USDA Risk Management Agency's stated approach.

Step 2: Define and Evaluate Alternative Allocation Strategies
Once the premium for each policy is estimated, AIR runs the core analytics of the model using the 10,000-event catalog along with the Insured Producer Performance (IPP) Score to optimize the portfolio. The risk associated with each policy in the book is evaluated and multiple allocation scenarios are developed and assessed to choose the best fund designation strategies. Some of these strategies are listed below.

Build Insured Producer Performance (IPP) Score

AIR uses the historical information of every policyholder from the client's M-13 Policy in decision-making. The IPP score is based on various risk metrics (e.g., loss ratio, loss cost, relative yield performance, effective coverage level, and irrigation practice) in combination with the length of available history and the level of information detail by producer. The IPP score provides an aggregated measure of a producer's past performance relative to their peers and is used to evaluate the potential risk due to a producer's historical performance.

Rate/Rank Policies

AIR rates each policy bundle (a policy bundle is a combination of state/county/crop type/policy type/coverage level/coverage type) in the client book of business with a unique probability of loss using our stochastic 10,000-event catalog. The stochastic events in the catalog are modeled yield/price combinations that use detrended historical yields. Each stochastic event is geographically correlated and incorporates the most recent changes in premium rates and policy structures of the U.S. MPCI program. IPP is then used with AIR's stochastic catalog to enhance the resolution of the model from policy bundle level to the individual producer level. This allows identification of well-rated versus poorly rated policies as well as high-performing versus low-performing producers. The use of this hybrid approach to rank policies leads to the development of an efficient frontier in the risk-return space.

Develop Multiple Allocation Scenarios

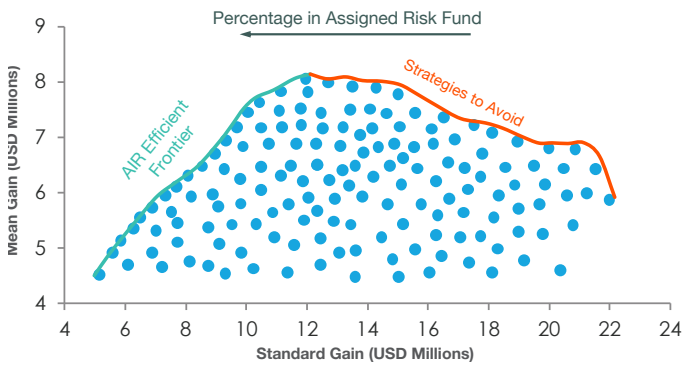
AIR assigns each one of the rated policies to either the Assigned Risk Fund or Commercial Fund based on their probability of loss and the premium retention values pre-determined by the client (if the client provides a desired range of retention levels). AIR then develops multiple scenarios by allocating policies into either the Assigned Risk Fund or the Commercial Fund. These allocation scenarios are then evaluated to inform the best allocation options.

Evaluate Each Scenario Against AIR's Stochastic Catalog

For each individual policy designation in the client book of business, AIR computes a premium value, losses, and average loss ratio using the 10,000 events in the stochastic catalog. AIR ranks the losses and loss ratios for each bundle, and constructs exceedance probability (EP) curves for several dozen designation strategies.

Conduct Risk-Reward Analysis

After screening the developed strategies, AIR eliminates those that are redundant (give lower expected return for higher level of risk) and chooses up to seven curves (strategies) that fit pre-designated criteria. AIR compares the client book with the overall industry book in each state to determine whether the client book is riskier than that of the overall industry. If yes, AIR recommends mainly conservative options; if not, AIR recommends more aggressive strategies.



The AIR model identifies the range of optimum retentions with the highest mean gain for their level of risk.

The figure illustrates how the AIR model generates different possible designation scenarios and then constructs the efficient frontier. In this example, each blue point is a possible allocation scenario that has different retention levels or different policies being placed in the Assigned Risk Fund. From right to left, with the increase of percentage in the Assigned Risk Fund, the associated

level of risk, which is reflected by the standard deviation of the gain, reduces. The AIR model identifies scenarios with the maximum expected post-SRA gain (y axis) based on your portfolio.

Allocation strategies to the right of the maximum mean gain scenario should be avoided as another optimized scenario exists on the left side that results in the same post-SRA gain and a lower level of risk. To the left of the maximum mean gain scenario is the AIR efficient frontier. Each of the allocation scenarios along this efficient frontier give the highest post-SRA gain for a given level of risk.

Step 3: Final Assessment and Reporting

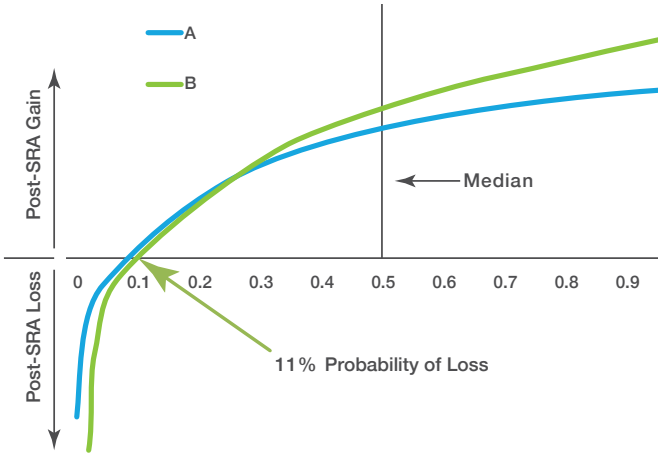
After a set of fund designation strategies within the desired premium retention range are identified, they are communicated to the client along with supporting metrics (e.g., EP curves for each strategy). AIR then works closely with the client to finalize which strategy or strategies best align with that client's goals. The final deliverables include a completed Record-9 for each designation strategy. Details of this process are provided below.

Choose Allocation Options

AIR communicates up to seven allocation strategies (plus the basic strategy that designates the entire premium into the Commercial Fund for comparison purposes) along with EP curves to ensure they fit the client's risk-return targets. If requested, additional allocation options from the efficient frontier may be provided, along with the associated EP curves.

For each fund designation strategy, AIR provides summary statistics that include the estimated modeled premium in the book of business, the estimated mean loss, median loss, and loss ratio, as well as a graphic display of all strategies as a function of expected post-SRA gain in dollars (y axis) with respect to 10,000 stochastic events that have been ranked from highest to lowest loss potential (x axis).

The figure shows an example of EP curves for two fund designation strategies with different outcomes with respect to potential gains and losses. In this example, Strategy A is a safer choice in years of adverse weather, but the gain potential is also limited in years of favorable weather. On the other hand, Strategy B shows a significant potential to increase post-SRA gains in good crop years, but is a riskier strategy with a higher probability of loss during adverse weather years. In the example, Strategy B intersects the x axis at an 11% probability of loss, indicating that there are 1,100 events (out of 10,000) generating a post-SRA loss.



An example of two fund designation strategies.

Send Record-9 Data to Client

For each one of the (up to) seven fund designation strategies, AIR provides (via secure FTP site) the detailed policy designation in Record-9 format for submission to the RMA. AIR consultants work one-on-one with the client to clarify modeling assumptions and risk-reward parameters.

Fund Designation Service Timeline of Deliverables

For each sale's closing date during the year (on average two during autumn and four during spring), AIR requires seven working days from the time a client uploads the M-13 records to the time the Record-9 for each of the fund designation strategies is delivered and a follow-up call is made to discuss results with the client.

Fund Designation Service Applications and Benefits

The AIR Fund Designation Service has several applications with a direct and beneficial impact on profitability.

Risk Transfer Benefits

Portfolio risk managers use the Fund Designation Service output to determine optimal reinsurance coverage required to protect their gains. Given that the AIR U.S. MPCI model is the industry-leading model for pricing stop loss and quota share treaties, insurers can potentially

save millions of dollars by providing reinsurers with a plan of operations based on AIR's Fund Designation Service, allowing them to more accurately analyze a company's unique risk profile against that of industry peers. Reinsurers are open to differentiate and price more favorably the treaty layers of a company using a systematic approach to fund designation.

Underwriting Benefits

Portfolio risk managers use the Fund Designation Service output to analyze the marginal impact on their profitability of adding new states for which they lack underwriting history. When comparing the results of the AIR Fund Designation Service with their internal model, one AIR client discovered that they had been less selective in terms of coverage level, county, and policy type. The AIR Fund Designation Service was able to increase their profitability significantly by making better choices about which policies to retain and which to cede.

Portfolio risk managers also use the Fund Designation Service output to quantify the profitability of the books of business provided by different agencies.

Enterprise Risk Management Benefits

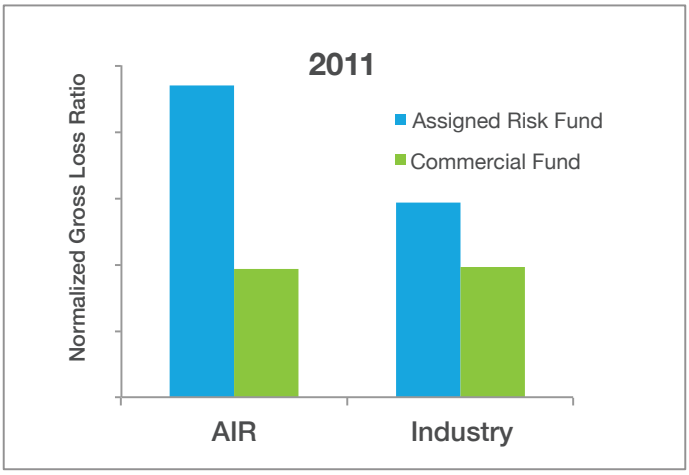
Portfolio risk managers use the Fund Designation Service output to communicate with management and stakeholders about the forecast portfolio gains and losses as the crop season progresses. This was particularly critical during the 2012 drought. Rating agencies also require crop insurance companies to be aware of their catastrophe risk potential as part of their rating process, and the Fund Designation Service output supplies all the information needed.

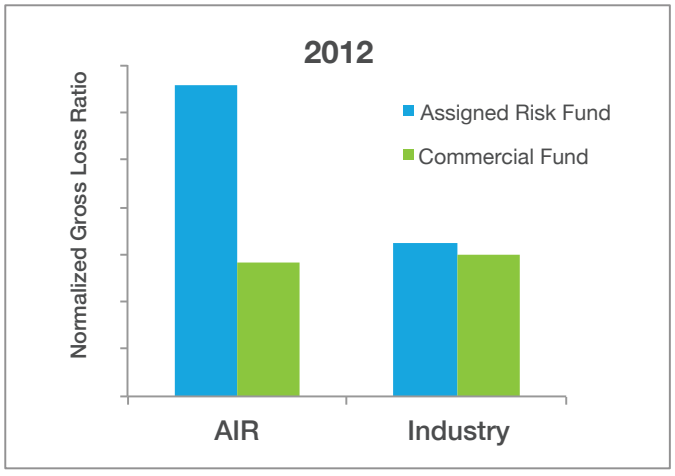
When portfolio risk managers base their decisions on AIR Fund Designation Service output, they can feel confident that the scientific and stochastic foundations of the U.S. MPCI model on which the output is based are well documented and reliable.

Industry Benchmarking

The bar charts show AIR's performance compared to that of the industry in 2011 and 2012. The comparison is made for similar retention levels and for a state where AIR had a representative market share in terms of volume and geographic diversity, to ensure a like-to-like comparison. The charts show normalized gross loss ratios for the Assigned Risk Fund and Commercial Fund allocations suggested by AIR relative to those implemented by the industry.

An efficient designation would place the riskier policies in the Assigned Risk Fund and the low-risk policies in the Commercial Fund. Thus, a good designation should have a higher gross loss ratio in the Assigned Risk Fund compared to the Commercial Fund (i.e., a larger difference between the height of the blue and green bars). The charts indicate that AIR's fund designation outperformed that of the industry in both a good year (2011) and a loss year (2012).





If you would like to learn more about the AIR Fund Designation Service, please contact Oscar Vergara at: overgara@air-worldwide.com

ABOUT AIR WORLDWIDE

AIR Worldwide (AIR) provides risk modeling solutions that make individuals, businesses, and society more resilient to extreme events. In 1987, AIR Worldwide founded the catastrophe modeling industry and today models the risk from natural catastrophes, supply chain disruptions, terrorism, pandemics, casualty catastrophes, and cyber incidents. Insurance, reinsurance, financial, corporate, and government clients rely on AIR's advanced science, software, and consulting services for catastrophe risk management, insurance-linked securities, longevity modeling, site-specific engineering analyses, and agricultural risk management. AIR Worldwide, a Verisk (Nasdaq:VRSK) business, is headquartered in Boston, with additional offices in North America, Europe, and Asia. For more information, please visit www.air-worldwide.com. For more information about Verisk, a leading data analytics provider serving customers in insurance, energy and specialized markets, and financial services, please visit www.verisk.com.

©2020 AIR Worldwide

AIR
A Verisk Business