

Leasing Workshop 27th October 2026

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Leasing Terminology

Sofema Aviation Considers Key Terminology Specifically Related to the Aircraft Leasing Environment

Damp Lease Specifics

A damp lease is an operating lease arrangement where an airline hires an aircraft along with the flight crew and the maintenance services required to operate it.

The defining characteristic of a damp lease is that the lessee provides its own cabin crew, distinguishing it from a wet lease (ACMI) where the lessor supplies both the flight and cabin crews.

Transitional (Training) Damp Lease:

- This arrangement is designed to evolve into a dry lease over time.
- The lessor initially provides the flight crew to operate the aircraft, but these pilots act concurrently as Line Training Captains.
- They train and type-rate the lessee's native flight crews during scheduled operations.
- As the lessee's pilots become certified, the lessor's pilots are phased out, and the lease "dries out."

Maintenance-Modified Damp Lease:

- While a standard damp lease includes the maintenance required to operate the aircraft, operational realities often dictate a split.
- The lessee's native ground crews may be contracted to perform routine "line maintenance" (daily checks, fluid top-ups, minor defect rectification) at their own hubs.
- The lessor retains sole responsibility and financial liability for heavy maintenance (scheduled shop visits, engine restorations, and C/D checks).

Seasonal "Dampening" (Dry-to-Damp Flex):

- An airline may hold a standard dry lease for an aircraft year-round, utilizing its own flight and cabin crews.
- However, during extreme peak seasons (like the European summer or Hajj), the lessee may contract the lessor to temporarily supply flight crews and line maintenance to alleviate crew shortages and avoid fatigue, temporarily converting the dry lease into a damp lease.

Maintenance Costs in Lease Agreements

- The lessee assumes full financial responsibility for the service, inspection, repair, and overhaul of the asset to maintain it in optimal operating condition.
- The total cost of an operating lease is typically the sum of the base leasing cost, security deposits, and maintenance reserves.
- Maintenance reserves are calculated based on flight hours, flight cycles, or calendar limits and are paid monthly in arrears.
- These reserve funds protect the lessor's asset value and are used to cover major scheduled maintenance events, such as engine performance restorations, landing gear overhauls, and Life Limited Part (LLP) replacements.

Lease Pre-Delivery Considerations

- Lessees must conduct intensive pre-delivery inspections to identify all discrepancies, as the signed acceptance certificate serves as legally binding, conclusive proof that the aircraft met the agreed-upon conditions at delivery.
- Delivery specifications must be reviewed using objective criteria to ensure the lessee is not exposed to impossible return conditions, such as clauses requiring non-LLP components to have full back-to-birth traceability.
- A lessee is never obligated to accept delivery if the aircraft fails to meet the contractually stipulated delivery conditions.

End of Lease Return Conditions and Costs

- The majority of severe financial penalties and delays during the redelivery process are directly traced to poor planning by the lessee.

- Aircraft engines typically represent the single largest cost exposure during a lease return, with shop visits easily running into the millions of dollars if return conditions are not actively managed.
- Redelivery requires impeccable technical records, including full back-to-birth (BTB) traceability for LLPs and complete "dirty fingerprint" (DFP) documentation for all repairs and modifications.
- Final return costs are often settled through Mirror-In/Mirror-Out or Zero-Time/Full-Life financial adjustment structures, where the lessor and lessee compensate each other based on whether the components are returned in a better or worse state than stipulated in the contract.

Introduction to Aircraft Maintenance Reserves

Sofema Aviation Considers Key Elements – Exposures and Mitigations related to the role of Maintenance Reserves

Introduction

The primary purpose of Maintenance Reserves (MRs) is to protect the lessor by ensuring that adequate funds are available to cover major aircraft maintenance activities.

Exposure: Lessee Default and Asset Devaluation

- **The Exposure:** If an operator defaults, the lessor is exposed to the risk of recovering an aircraft that requires significant and costly outstanding maintenance.
- **Best Practice Mitigation (Monthly MRs):** To mitigate this, lessors collect maintenance reserve payments, which provide the lessor with value protection throughout the lease in the event of default.
- **Calculation and Collection:** These payments are generally calculated based on flight hours, flight cycles, or calendar time. They are typically paid monthly in arrears. This guarantees that when an aircraft is grounded for maintenance, the lessor already holds the funds to cover the costs.

Exposure: Misallocation of Maintenance Funds

- **The Exposure:** There is a risk that funds intended for one specific part of the aircraft might be depleted to cover shortfalls in another area, leaving major components underfunded.
- **Best Practice Mitigation (Segregated Funds):** Maintenance reserves are treated as multiple, dedicated "pots" or funds. Each pot is strictly dedicated to a specific element, such as Airframe Heavy Structural Inspections, Landing Gear Overhauls, Engine Performance Restoration, Engine Life Limited Parts (LLPs), and Auxiliary Power Unit (APU) Restoration.
- **Strict Separation:** These funds are kept separate from one another and cannot be used to bridge shortfalls in other pots.

- **Ownership Rules:** Upon payment, the funds legally belong to the lessor. The lessee must claim reimbursement only after the maintenance works have been completed and provided their account is up to date.

Exposure: Asset Return Condition Risk

- **The Exposure:** At the end of the lease, the lessee might return the aircraft in a condition that is worse than what was stipulated in the lease agreement.
- **Best Practice Mitigation (End of Lease Adjustments):** Lessors utilize End of Lease Financial Adjustments to ensure they are compensated for maintenance degradation. If the asset is returned in a worse condition, the lessee must pay the lessor. Conversely, if it is returned in a better condition, the lessor is obliged to pay the lessee.
- **Adjustment Structures:** This is managed through structures like "Mirror-In / Mirror-Out," where either party may pay an adjustment based on circumstances and condition, or "Zero-Time or Full-Life," where the lessor receives a payment for the time the asset was used since new or since its last overhaul.
- **Best Practice Mitigation (Letters of Credit):** A maintenance Letter of Credit (LOC) can be utilized to guarantee that the lessee will return the asset in the exact condition required by the lease agreement.

Exposure: High-Credit Operator Exemptions

- **The Exposure:** Some "major" airlines possess credit profiles strong enough to insist on bypassing the entire maintenance reserve provision, leaving the lessor without monthly cash protection.
- **Best Practice Mitigation (Risk-Based Collateral):** While lessors prefer having MRs in place, they manage this exposure by making risk-based decisions that balance the lack of MRs against the size and duration of the lease arrangement (how many aircraft and for how long).
- **Alternative Security:** When MR payments are waived, lessors rely on "Collateral Security" such as an End of Lease Financial Adjustment or a Letter of Credit (LOC). However, lessors will generally insist on standard MR payments from any operator whose balance sheet does not show evident financial strength.

Aircraft Lease Maintenance Reserve Considerations

Sofema Aviation (SA) Takes a Deep Dive into the Process of Managing & Assessing Maintenance Reserves

Introduction

Maintenance cash flow forecasting involves analyzing ongoing, maintenance-related expenses as particular aviation assets age.

- The fundamental objective of maintenance reserves (MR) is to protect the leasing company by ensuring funds are available to cover the capital and financing costs of the underlying asset during major maintenance events.

The Maintenance Reserve Forecasting Trap

The "trap" occurs when there is a critical disconnect between theoretical industry-standard maintenance costs and the operational reality of the aircraft.

- Actual maintenance costs may be very different from the lessor's expectation for "industry standard" costs.
- Because maintenance costs are typically rising at a rate in excess of 3% per annum, failing to correctly identify required MR and End of Lease (EOL) cash flows can have a massive impact on business success.
- For example - Engines present the most significant forecasting trap.
 - Engines represents approximately 25% of a new aircraft's asset value, but this balloons to approximately 90% of the asset's end-of-life value.
- If forecasting relies only on minimum operating conditions and manual assumptions, lessors and lessees risk massive exposure.
- To compensate for these unknowns, companies sometimes hold back funds as a workaround, which effectively locks up millions of dollars in capital.

Key Issues and Challenges

- **Operating Environments:** Aircraft operating in sandy or hot/humid environments experience significantly different wear rates than standard models predict.
- **Utilization Disconnects:** A maintenance program optimized for a specific flight profile loses effectiveness if the ratio between Flying Hours and Flight Cycles varies significantly.
- **Fund Segregation:** Maintenance reserves consist of multiple distinct funds or "pots" dedicated to particular aspects (e.g., engines, landing gear, APU), which are strictly separated and cannot be used to bridge shortfalls in other areas.
- **Regulatory & Modification Anomalies:** Existing Corrosion Prevention and Control Programs (CPCP) may prove inadequate if aircraft utilization drops, accelerating wear and inflating costs unexpectedly.

Best Practices for MR Forecasting

To mitigate the forecasting trap, both lessors and lessees must rely on rigorous data rather than static baseline assumptions.

- **Dynamic Analysis:** Continuously analyze client-provided data, including leasing contracts, technical specifications, cumulative utilization, and prior maintenance activity.
- **Account for Specific Variables:** Factor in the geographical region of operation, the exact flight hour to flight cycle ratio, whether the engine is new or mature, and any applied derates.

- **End-of-Lease Alignment:** Ensure the forecasting models specifically align with the contract's End of Lease (EOL) financial adjustment structure (e.g., Mirror-In/Mirror-Out or Zero-Time/Full-Life).

Case Study: Reconciling a Maintenance Reserve Shortfall

Scenario: A lessee operating a narrowbody aircraft is required to perform an engine performance restoration shop visit. The actual cost of the overhaul totals \$4.5 million. However, over the preceding years, the specific engine MR "pot" has only accumulated \$3 million.

How the Shortfall is Reconciled:

1. **Strict Claim Limits:** Maintenance reserves "belong" to the lessor upon payment. When the aircraft is taken out of service, the lessee must claim reimbursement in arrears. Crucially, the payout is limited to the actual cost of the maintenance event or the maximum amount currently accrued in that specific reserve pot, whichever is lower.
2. **The Lessee Bears the Deficit:** Because MR funds are segregated and cannot be cross-collateralized (e.g., borrowing from the landing gear pot to pay for the engine), the lessee is contractually obligated to pay the remaining \$1.5 million out-of-pocket to the Maintenance, Repair, and Overhaul (MRO) provider to complete the overhaul.
3. **End of Lease (EOL) Adjustments:** If a discrepancy exists at the end of the lease rather than during a mid-lease shop visit, it is handled via the EOL adjustment structure. If the engine is returned in a worse than stipulated condition, the lessee must make an EOL cash payment to the lessor to cover the difference. Conversely, if the engine is returned in a better than stipulated state, the lessor is obliged to pay the lessee.
4. **Default Protections:** If the lessee cannot cover the \$1.5 million shortfall and declares bankruptcy, the lessor uses the accumulated \$3 million to partially mitigate their losses, highlighting why lessors insist on collecting reserves in the first place.

Challenges to ensure Maintenance Reserve Provisions Align with the Actual Maintenance Programme and aircraft Utilisation?

Sofema Aviation (SA) Reviews key issues related to Maintenance Reserves

Introduction

From a CAMO (Continuing Airworthiness Management Organisation) perspective, verifying that maintenance reserve (MR) provisions align with the Aircraft Maintenance Programme (AMP) and anticipated aircraft utilisation is critical to protecting an operator's cash flow and minimizing end-of-lease liabilities.

Key Points to Verify in the Lease Agreement

Basis of Reserve Calculations: Maintenance reserve payments are typically calculated on a flight hour, flight cycle, and/or calendar basis.

- CAMO must verify that the metrics triggering MR payments mirror the thresholds driving the AMP tasks.
- Because service time related to flight hours or cycles drives the MR calculation, any disconnect between how rent is charged and how maintenance is generated will cause financial discrepancies.

Definition of Qualifying Maintenance Events: The lease agreement typically specifies the exact maintenance events covered by reserve payments.

• CAMO must confirm that the MR funds cover major routine activities, such as Airframe Heavy Structural Inspections, Landing Gear Overhauls, Engine Performance Restorations, Engine Life Limited Parts (LLPs), and APU Restorations.

Inclusion of Service Bulletins and Modifications: CAMO must clarify whether the maintenance reserves can be utilized for non-routine findings or the embodiment of Service Bulletins (SBs), especially those impacting performance and operational effectiveness.

End-of-Lease Payment Structures: Verify the financial adjustment mechanisms for redelivery, which generally fall into two categories: Mirror-In / Mirror-Out (where either party pays an adjustment based on the condition relative to delivery) or Zero-Time / Full-Life (where the lessor receives payment for time used since the last overhaul or since new).

Primary Challenges and Risks

Utilisation Profile Mismatches: The Maintenance Review Board (MRB) sets task intervals based on a "typical" flight profile. If an operator's actual utilisation deviates significantly, such as shifting from a flying-hours-based model to short, cyclic sectors—tasks lose their effectiveness.

- If annual utilisation falls outside a plus or minus 25% range of the expected figure, the AMP must be reviewed.
- Failure to align the lease's MR accrual rates with this actual, shifted utilisation can leave the operator underfunded when early maintenance is triggered.

Accident, Incident, and Non-Routine Exclusions: Maintenance reserves are intended to cover routine maintenance. In the event of an incident or accident, maintenance reserves are explicitly not available for drawdown.

Ambiguous Redelivery Terminology: Subjective phrasing in the lease, such as "reasonable wear and tear," frequently creates costly disputes during aircraft transition.

Over-Maintaining vs. Under-Maintaining: Over-maintaining an aircraft does not increase its value for the operator, but under-maintaining it can create significant financial penalties if the resulting deterioration impacts lease return conditions.

Best Practices for CAMO

Ensure Full Contractual Visibility: The CAMO must have complete access to, and knowledge of, the leasing agreement's contents; without this visibility, it is almost impossible to effectively and economically manage the aircraft's redelivery.

Implement Rigorous Maintenance Cash Flow (MCF) Forecasting: CAMO should collaborate with finance to continuously forecast MR cash flows.

- This involves analyzing client-provided data, cumulative utilization, previous maintenance activities, and specific operational conditions (e.g., flight hour to cycle ratio, geographical region, and hot/humid environments) to determine precise cash inflow and outflow projections.

Pre-Plan the Drawdown Process: Maintenance reserves belong to the lessor upon payment, meaning the lessee must proactively claim reimbursement in arrears for completed work.

CAMO should confirm the contractual claim windows for these drawdowns to prevent millions of dollars from becoming "locked up" by the lessor.

Monitor Downtime: During maintenance checks where the aircraft is not actively flying, no reserves are due. CAMO should coordinate with planning teams to ensure these non-flying periods are accurately recorded so the airline is not over-billed by the lessor.

How are Maintenance Reserves Reconciled when Actual Maintenance Costs are Significantly Higher than the Amount Accumulated?

Sofema Aviation Services (SA) Considers key challenges related to Maintenance Reserves

Introduction

When actual maintenance costs exceed the accumulated maintenance reserves (MR), the financial burden typically falls entirely on the lessee, leading to the massive end-of-lease bills that often blindsides unengaged operators.

- The process of managing MR and End of Lease (EOL) compensation cash flows contains significant challenges, largely due to the massive sums involved and the strict legal protections built in favor of the lessor.

Challenges in Reconciling Maintenance Shortfalls

Siloed Reserve "Pots": Maintenance reserves are separated into multiple dedicated funds or "pots" for specific elements (e.g., engines, landing gear, APU), and these funds cannot be mixed or used to bridge any perceived shortfalls in another category.

Payout Restrictions and Actual Cost Discrepancies: MR funds legally belong to the lessor upon payment, and lessees must claim reimbursement in arrears.

- Payouts are capped strictly up to the actual cost of the maintenance event. However, actual maintenance costs can be very different from the lessor's "industry standard" expectations, easily creating funding gaps.

End of Lease Financial Adjustments: Under EOL adjustment structures, if a component is returned in a condition worse than stipulated in the contract, the lessee is legally obligated to make an end-of-lease payment to the lessor to cover the shortfall.

Lessor Control: Lessors hold ultimate control over the maintenance reserves, meaning they benefit from the large cash balances and possess the power to make decisions that impact the economic life of the aircraft, including enforcing caps or limits applied to specific pots of allocated funds.

Best Practices for Mitigation and Protection

Rigorous Maintenance Cash Flow (MCF) Forecasting: Operators must treat MR tracking as a critical financial discipline.

- MCF forecasting requires actively analyzing leasing contracts, technical specifications, cumulative utilization, prior maintenance activity, and specific operating conditions (like hot or humid environments). Any failure to correctly identify the required MR and EOL cash flow can have a significant negative impact on the business.

Mastering the Adjustment Structure: Operators must fully understand their specific EOL payment structure to plan their cash flow.

- This involves knowing whether the contract dictates a "Mirror-In / Mirror-Out" adjustment (where either the lessee or lessor may pay an adjustment based on circumstances) or a "Zero-Time / Full-Life" requirement (where the lessor receives payment for the exact time used since the last overhaul or since new).

Tracking Claim Windows: Operators must strictly monitor the contractual claim window for cost-sharing and MR drawdowns.

- Failing to submit a timely, compliant claim in arrears effectively leaves the operator paying twice—once into the reserve, and again out-of-pocket for the maintenance.

Utilizing Alternative Security: Operators with strong balance sheets and good credit status can negotiate to avoid paying maintenance reserves altogether.

- Instead of locking up cash, these airlines offer additional security or a maintenance Letter of Credit (LOC) to guarantee that they will return the asset in the condition required by the lease.

How do Aviation Lessors Hedge Against Residual Value Risk?

Sofema Aviation (SA) Discuss how Lessors protect aircraft asset values through structured financial, technical, and contractual mechanisms designed to preserve net present value (NPV), transferability, and secondary-market liquidity.

How Lessors Hedge Against Residual Value Risk

Maintenance Reserves (MRs): Lessors collect monthly, non-refundable reserve payments calculated on a per-flight-hour, per-flight-cycle, or calendar-month basis.

- These dedicated funds cover major scheduled events, including:
 - Airframe heavy checks,

- Engine performance restorations,
- Life Limited Part (LLP) replacements,
- Landing gear overhauls, and
- APU restorations.

Funds belong to the lessor upon payment, and lessees must claim reimbursements in arrears after completed maintenance is verified.

Security Deposits and Letters of Credit (LOCs): Security deposits (typically 2 to 3 months of lease rent) or maintenance LOCs provide financial collateral against lessee default, unperformed maintenance, or non-compliant redelivery condition.

Strict Return Conditions & Monetary Adjustments: Leases specify mandatory minimum remaining life thresholds for hard-time components and LLPs at return.

- Mechanisms such as Mirror-In/Mirror-Out or Zero-Time/Full-Life adjustments force the lessee to pay cash compensation for all utility consumed during the lease term.

Part and Repair Restrictions: To maintain asset marketability and transferability across global jurisdictions, lessors strictly restrict or prohibit the use of Parts Manufacturer Approval (PMA) parts and Designated Engineering Representative (DER) repairs, which can artificially deflate asset valuation.

Back-to-Birth (BTB) Traceability: Lessors mandate 100% Back-to-Birth paper traceability for all critical rotating LLPs and full "dirty fingerprint" (DFP) documentation for all structural repairs to prevent permanent value impairment.

Discussion: Why Lessees Bear the Brunt of Asset Risk

In commercial aircraft leasing, contractual frameworks heavily insulate lessors from asset degradation and market fluctuations, transferring operational and maintenance risks onto lessees:

"Hell or High Water" Covenants: Operating leases contain non-cancelable payment clauses requiring lessees to make full monthly lease payments regardless of operational challenges, technical failures, or regulatory groundings.

Net Lease Structure & Acceptance Certificates: Under net leases, all operational and maintenance risks belong solely to the lessee once the aircraft is accepted.

- The signed Acceptance Certificate acts as conclusive legal proof that the aircraft met delivery standards, barring the lessee from making post-acceptance claims against the lessor for pre-existing latent defects.

Exceeding Regulatory Minimums: Regulatory airworthiness standards (e.g., EASA or FAA minimums) dictate only that an aircraft is safe to fly.

- Lease covenants enforce strict commercial return conditions, such as specific residual hours/cycles remaining, clean records, and cosmetic standards, that require substantial lessee capital outlays at lease end.

Asymmetric Bargaining at Redelivery: Lessors maintain strong leverage at lease return through strict contract enforcement, penalties for late redelivery, and ongoing daily lease rate charges while disputed technical issues are resolved.

Key Challenges

For Lessees

Late Redelivery Preparation: Commencing return planning too late is the single largest cause of project delays, extra lease payments, and unbudgeted check expenses.

Uncontrolled Engine Exposure: Engine overhauls are the costliest return item. Failure to track engine health and minimum return covenants can result in unexpected multi-million dollar shop visits.

Record Disconnects and Missing BTB Data: Gaps in technical records, missing original birth certificates (EASA Form 1 / FAA 8130-3), or unapproved PMA/DER installations can force complete part replacements prior to acceptance.

Operational vs. Contractual Blind Spots: Airline engineering teams often manage maintenance to operational airworthiness standards without full visibility into specific legal lease covenants.

For Lessors

Lessee Default & Bankruptcy: Reclaiming assets from insolvent airlines where maintenance reserves or security deposits may not fully cover neglected airframe or engine degradation.

MRO & Supply Chain Bottlenecks: Limited MRO check slots and long lead times for cabin materials or structural parts that delay re-leasing the aircraft to the next operator.

Best Practices

1. Pre-Lease Due Diligence

- Conduct intensive pre-delivery physical inspections and complete technical record reviews before executing the Acceptance Certificate.
- Ensure return covenants are defined using objective technical metrics rather than ambiguous terms like "reasonable wear and tear".

2. Milestone Redelivery Timeline

- **24 Months Out:** Formally initiate the end-of-lease project, review lease agreement covenants against current aircraft status, and evaluate major component/engine performance.
- **12–15 Months Out:** Perform detailed gap analysis against return conditions, select the MRO facility for the return check, and align CAMO, engineering, and finance teams.
- **6–9 Months Out:** Conduct cabin and cargo physical surveys to order long-lead items, assemble technical records binders, and perform preliminary engine/APU borescope inspections.
- **2–4 Months Out:** Present historical technical records to the lessor for advance review, complete high-power engine assurance runs, and perform the acceptance test flight.

3. Continuous Technical Governance

- Maintain continuous Back-to-Birth documentation, certified logbook entries, and dual-release certificates for every part installed during the lease.
- Reconcile monthly maintenance reserve collections against actual maintenance events and ensure compliance with drawdown claim windows.
- Monitor aircraft utilization ratios (flight-hour to flight-cycle ratio) relative to the Approved Maintenance Program (AMP) baseline to prevent early component degradation.

CAMO Roles, Responsibilities, and Relevance Related to Aircraft Lease Management and Maintenance Reserves

Sofema Aviation (SA) Considers roles and responsibilities to ensure effective Aircraft lease management.

Introduction

Effective aircraft lease management requires the CAMO to maintain comprehensive visibility into lease agreements and reserve utilization rules.

- By leveraging robust Maintenance Cash Flow forecasting and continuously adjusting for operational variables like geographic conditions and flight ratios, operators can accurately project major maintenance costs.
- This proactive approach mitigates end-of-lease financial exposure, ensures technical compliance, and protects the aircraft's long-term asset value against unforeseen funding gaps.

Data Access Requirements

The Continuing Airworthiness Management Organisation (CAMO) must possess full access to and knowledge of the leasing agreement to manage the aircraft's asset value and achieve a cost-effective redelivery.

- Without comprehensive visibility into the lease obligations, it is nearly impossible for the CAMO to effectively manage technical compliance or plan for return conditions.
- While the lessor aggregates the maintenance reserves to protect the asset's value, these funds belong to the lessor upon payment; the lessee's CAMO is responsible for claiming reimbursement in arrears once required maintenance is completed.

Assessing Reserve Sufficiency via Forecasting

- To determine if reserves are realistic, the CAMO must conduct comprehensive Maintenance Cash Flow (MCF) forecasting to project long-term cash inflows and outflows.
- This assessment requires analyzing client-provided data, including leasing contracts, technical specifications, cumulative utilization, and previous maintenance activity.
- Based on controlling intervals and historical data, the CAMO should be able to project costs for major, fundable events, such as
 - Heavy Structural Inspections,
 - Landing Gear Overhauls,
 - Engine Performance Restoration,
 - Engine Life Limited Parts (LLPs), and
 - APU Restoration

- Engine maintenance forecasting requires stringent assessment, as the engine represents approximately 25% of a new aircraft's value, but up to 90% of the aircraft's end-of-life asset value.

Challenges and Issues

- Failing to accurately identify the required maintenance reserves and End of Lease (EOL) compensation cash flows can severely impact the financial success of the business.
- Maintenance reserves are designated strictly for routine maintenance and are not available to cover damage from incidents or accidents, which can create sudden funding gaps.
- Forecasting software often only factors in minimum operating conditions, requiring the CAMO to manually adjust for harsh geographic environments (e.g., sandy, hot, or humid conditions), varying flight lengths, and previous work scopes.
- Because lessors retain ultimate control over the reserve funds, they may make decisions that impact the aircraft's economic life, such as withholding funds to cover perceived unknowns.

Best Practices

- The CAMO must explicitly understand what the maintenance reserves can be utilized for, particularly regarding whether Service Bulletin (SB) embodiment for performance and operational effectiveness qualifies for drawdown.
- Engine forecasting should be continuously refined by analyzing the specific geographic region of operation, flight hour to flight cycle ratios, and applicable derate factors to prevent EOL financial exposure.

Considering CAMO Key Risks Areas when coordinating aircraft lease requirements, maintenance reserves and insurance obligations between the Lessor, Lessee and Operator

Sofema Aviation takes a look at the various challenges within the Leasing ECO System

Introduction

The Continuing Airworthiness Management Organization (CAMO) plays a critical role in bridging the regulatory requirements of airworthiness with the stringent commercial obligations dictated by aircraft lease agreements.

- While the ultimate responsibility for the aircraft's airworthiness rests with the operator (lessee), the CAMO must actively manage the technical and financial exposures related to the asset's lifecycle, maintenance reserves, and eventual redelivery.

Key Responsibilities and Obligations

- **Lease Agreement Integration:** The CAMO must maintain full visibility of all specific lease agreement obligations, ensuring they are managed alongside standard regulatory requirements. This includes strict compliance with Airworthiness Directives (ADs), structural inspection programs, and aging aircraft requirements.
- **Aircraft Maintenance Program (AMP) Customization:** The operator owns the AMP, which is based on the Type Certificate Holder's Maintenance Planning Document (MPD) but must be customized and approved by the regulatory authority. The CAMO is responsible for ensuring that the AMP reflects both the operational profile and any specific lease constraints.
- **Technical Records and Traceability:** An aircraft's value is severely compromised without meticulous technical records. The CAMO must ensure flawless Back-to-Birth (BTB) traceability for Life Limited Parts (LLPs) and retain original "dirty fingerprints" (DFPs) for all repair certifications.

Key Risks and Exposures

- **Redelivery Delays and Financial Penalties:** The majority of issues encountered during the lease return process stem from poor planning on the part of the lessee. Engines typically incur the greatest costs during return, with unbudgeted shop visits easily running into the millions of dollars if minimum return lease obligations are not monitored.
- **Unauthorized Parts and Repairs:** Lessors depend on asset transferability and often restrict the use of Parts Manufacturer Approval (PMA) parts and Designated Engineering Representative (DER) repairs. The presence of non-OEM components or DER repairs can artificially deflate aircraft value and complicate redelivery, representing a major financial exposure for the operator if installed without lessor consent.
- **Maintenance Reserve (MR) Mismanagement:** Maintenance reserves are monthly payments collected by the lessor to cover major events such as heavy maintenance visits, landing gear overhauls, and engine performance restorations. Because these funds legally belong to the lessor upon payment, the CAMO risks forfeiting operator capital if they fail to properly track MR balances or fail to submit timely, compliant claims for reimbursement in arrears.
- **Accident and Incident Exclusions:** Maintenance reserves are intended strictly for routine major maintenance. In the event of an incident or accident, maintenance reserves are explicitly unavailable to cover repair costs, requiring the operator to rely entirely on aviation insurance provisions.

Best Practices for the CAMO

- **Intensive Pre-Delivery Inspections:** Before executing a lease, the CAMO should perform an exhaustive pre-delivery inspection to uncover any discrepancies. Once the lessee signs the acceptance certificate, it serves as conclusive proof that the aircraft met the delivery conditions, and the lessee assumes all risk for the aircraft's state.

- **Long-Range Redelivery Planning:** A successful lease return requires forward planning starting 15 to 24 months prior to handover. By 12 months out, the CAMO should perform a detailed analysis of all return conditions to identify potential issues when mitigations are still relatively easy to implement.
- **Strategic Engine Management:** Because engines represent a massive portion of the aircraft's value, the CAMO should continuously monitor Engine Condition Trend Monitoring (ECTM) data and align shop visits with both the aircraft's economic lifecycle and the lease's redelivery conditions.
- **Proactive Claims and Fund Optimization:** The CAMO must continuously track the size and availability of maintenance reserves to ensure the operator receives their full entitlement. This includes understanding exactly what the reserves can be used for—such as specific Service Bulletin (SB) embodiments—to maximize the operator's return on investment while protecting the lessor's asset value.

Aircraft Insurance Role & Purpose

Sofema Aviation (SA) Considers the following question – “Is it true that if accident takes place where it is pilot’s error, Insurance cannot be claimed?”

Introduction

Commercial aircraft operators maintain a multi-layered insurance portfolio designed to protect the physical asset, mitigate third-party risks, and satisfy strict lessor and regulatory requirements. The typical suite of aviation insurance policies includes:

- **Aircraft Hull Insurance:** This covers physical damage to the aircraft itself. It is usually purchased as "All Risk" coverage, protecting the asset whether it is in flight, taxiing, or parked. Lessors typically require the hull to be insured for an "Agreed Value" rather than actual cash value, ensuring a predictable payout to settle the lease if the aircraft is a total loss.
- **Aviation Liability Insurance:** This protects the operator against legal claims arising from property damage or bodily injury. It is typically structured in two parts, though modern commercial policies often bundle them:
- **Hull War and Allied Perils:** Standard hull policies explicitly exclude damage resulting from war, terrorism, hijacking, strikes, riots, and malicious acts. Operators must purchase this specific add-on to cover those exact threats. If the aircraft is leased, the leasing company will almost universally mandate this coverage.
- **Spares and Equipment Insurance:** Because engines, APUs, and landing gear are incredibly valuable even when detached from the airframe, this covers uninstalled parts, spare engines, and specialized tooling against damage, fire, or theft while in the hangar, in storage, or during transit.

Aircraft Hull Insurance Rates

For typical fixed-wing aircraft, annual hull insurance rates generally range between 0.9% and 1.5% of the agreed value of the aircraft.

- Therefore, for every \$1,000,000 of insured hull value, the annual hull premium typically costs between \$9,000 and \$15,000.
- Hull coverage is the most expensive component of an aviation policy, accounting for roughly 65% to 75% of your total premium.

Pilot Events (80% of events are typically caused by Human Factors)

Standard Aviation insurance policies are actually designed specifically to cover accidents caused by pilot error. If an accident occurs due to a genuine mistake, oversight, or negligence by the pilot, the insurance claim is generally valid and will be paid.

- The critical factor (Which typically aligns directly with qualifications, training, and competence, is usually governed by the "Pilot Warranty" clause in an insurance policy.
- Insurers do not expect perfection, but they do require baseline competence.
- When it is established that all credentials, certificates, and training are correct and legal, the pilot meets the exact legal and competence baseline required by the insurer.
- As long as the pilot was acting within the scope of their legal qualifications and the policy's specific stipulations, an error in judgment or flying technique does not void the coverage.

Important Note - Exceptions typically only apply to intentional acts of damage, criminal activity, or flying while intoxicated.

Types of Insurance Available in Support of Aircraft Leasing

Sofema Aviation (SA) Considers key aspects of aircraft Insurance and related considerations.

Introduction

Insurance allocation in aircraft leasing depends fundamentally on the lease structure:

In a Wet (ACMI) lease, the lessor provides the insurance,

Whereas in a Dry lease, the lessee must secure comprehensive coverage.

To protect the aircraft's asset value and the financial interests of all parties, lease agreements mandate strict aviation insurance programs before the aircraft can enter service.

Required Insurance Policies

Hull All Risks Insurance: Covers accidental physical loss or damage to the aircraft (e.g., collisions, fire, weather) while in the air or on the ground.

Hull All Risks Insurance is the foundational property coverage for an aircraft. In a leasing context, it protects the physical asset itself and guarantees that the lessor's financial stake is fully secured if the aircraft is destroyed or severely damaged.

Here is a deeper look at how Hull All Risks operates within an aircraft lease:

The "Agreed Value" Standard Unlike typical auto or property insurance that pays out actual cash value (accounting for depreciation), aviation hull insurance almost exclusively uses an **Agreed Value**.

- The lessor and lessee stipulate this exact dollar amount in the lease agreement.
- The Agreed Value is usually set higher than the current market value of the aircraft to cover the outstanding financing, lease termination costs, and potential remarketing fees.
- In the event of a total loss, the insurer pays this exact amount, no questions asked about depreciation.

Scope of Operational Coverage The policy is structured to cover the aircraft across all phases of operation, typically categorized as:

- **In-Flight:** From the moment the aircraft accelerates for takeoff until it completes its landing run.
- **Taxiing:** Moving under its own power on the ground (e.g., gate to runway), which carries high risks for wing-tip collisions or ground vehicle strikes.
- **Ground/Moored:** While parked and unpowered. This covers risks like hangar collapses, severe weather (hail, hurricanes), or accidental damage by ground support equipment.

Partial vs. Total Loss Mechanics How a claim is handled depends on the severity of the damage:

- **Partial Loss:** If the aircraft is damaged but repairable, the policy covers the cost of repairs, including parts, labor, and transportation. *Lease implication:* The lease will dictate that all repairs must be performed by approved Maintenance Repair Organizations (MROs) using OEM-certified parts to maintain the aircraft's "Back-to-Birth" traceability and overall value.
- **Constructive Total Loss (CTL):** If the cost to repair the aircraft exceeds a certain percentage of the Agreed Value (often 70-80%), it is declared a CTL. The insurer pays out the full Agreed Value to the lessor (as the Loss Payee), the lease is terminated, and the insurer takes ownership of the salvageable wreckage.

Critical Exclusions Despite the name "All Risks," this policy does not cover everything. It explicitly excludes:

- **Wear and Tear:** Gradual deterioration, corrosion, or metal fatigue.
- **Mechanical Breakdown:** If an engine simply fails internally due to a mechanical fault, the hull policy will not replace the engine (though it *will* cover the ensuing damage if that engine failure causes the plane to crash).
- **War and Terrorism:** Any damage caused by hijacking, sabotage, strikes, or acts of war is strictly excluded. This is why the lessor mandates the lessee to purchase a separate **Aviation Hull War Insurance** policy to plug this gap.

Aviation Hull War Insurance: A standalone policy covering perils explicitly excluded from standard hull policies, including acts of war, terrorism, sabotage, hijacking, and government confiscation.

Aviation Hull War Insurance exists specifically to fill the massive coverage gap left by the standard Hull All Risks policy. Standard policies uniformly exclude damage resulting from malicious acts, political violence, or geopolitical conflict. For an aircraft lessor, these "war risks" represent some of the highest-severity threats to their asset, requiring a specialized standalone policy.

The "Write-Back" Mechanism

In aviation insurance, war risks are handled through a mechanism of exclusion and "write-back." The standard Hull All Risks policy contains a sweeping exclusion clause (typically the AVN48B clause) that strips out coverage for any hostile acts.

To satisfy the lease requirements, the lessee must purchase a separate Aviation Hull War policy (often operating under the LSW555D London market standard) that explicitly "buys back" these exact excluded risks.

Specific Perils Covered

Despite the name, "War Insurance" covers a much broader spectrum of malicious and political risks than just declared military conflicts. The core coverages include:

- **Confiscation and Nationalization:** A critical peril for lessors. If a foreign government illegally seizes, requisitions, or refuses to release the leased aircraft (as seen extensively with leased fleets in Russia in 2022), this policy compensates the lessor for the total loss of the asset.
- **Terrorism and Sabotage:** Any act of politically or ideologically motivated violence, including explosive devices or intentional destruction.
- **Hijacking and Unlawful Seizure:** Physical damage sustained during a hijacking or the illegal diversion and holding of the aircraft.
- **Strikes, Riots, and Civil Commotion (SRCC):** Damage caused by violent protests, localized uprisings, or labor strikes spilling onto the tarmac.
- **Malicious Damage:** Intentional sabotage by individuals, such as a disgruntled employee intentionally destroying avionics.

The 50/50 Clause (AVN111)

One of the most important mechanisms in aircraft lease insurance is the "50/50 Provision" (AVN111). When an aircraft is lost under ambiguous circumstances—for example, it crashes over a conflict zone or goes missing over the ocean—it may be unclear whether it suffered a catastrophic mechanical failure (a Hull All Risks claim) or was shot down/hijacked (a Hull War claim).

Historically, both insurers might deny the claim and point fingers at each other, leaving the lessor out of pocket. To prevent this, lease agreements mandate the 50/50 clause. If the insurers cannot agree on who is liable within a set timeframe, both the Hull All Risks and Hull War insurers must immediately pay

50% of the Agreed Value to the lessor. The insurers then take the dispute to arbitration to determine who ultimately bears the final cost, while the lessor is made whole immediately.

Absolute Exclusions

Even Hull War policies have hard boundaries. They uniformly exclude:

- **The Five Great Powers Clause:** If a major war breaks out between any of the UN Security Council permanent members (the US, UK, France, Russia, or China), the policy is automatically voided. The global insurance market simply does not have the capitalization to survive a superpower conflict.
- **Nuclear Detonation:** Any loss caused by a nuclear weapon, radioactive contamination, or dirty bomb is universally uninsurable.
- **Financial Default or Repossession Hindrance:** If a lessee goes bankrupt and hides the aircraft to avoid repossession, this is considered a financial breach of contract and theft by the operator—not a political confiscation covered under the war policy.

Aviation Liability Insurance: Protects against third-party claims for bodily injury and property damage, as well as passenger, cargo, and mail liability. This is often structured as a Combined Single Limit. (Here is a detailed breakdown of how Liability Insurance functions within the aviation industry)

Aviation Liability Insurance

Aviation operations carry immense financial risk. A single incident can cause catastrophic damage to passengers, cargo, and ground infrastructure. Aviation liability insurance is designed to protect aircraft owners, operators, and airlines from the staggering financial impact of these claims.

Here is how the specific coverage areas break down:

Third-Party Liability (Public Liability)

This covers damages caused to entities *outside* of the aircraft itself. It is mandatory in almost all jurisdictions.

- **Bodily Injury:** Covers medical expenses, legal fees, and settlements if the aircraft injures or kills someone who is not a passenger or crew member. This often includes people on the ground, ground service personnel, or individuals in another aircraft in the event of a collision.
- **Property Damage:** Covers the cost to repair or replace property damaged by the aircraft. This could include damage to airport infrastructure (hangars, runway lights, terminals), private property (if an aircraft makes an emergency landing in a field or residential area), or other aircraft on the tarmac.

Passenger Liability

Unlike standard third-party liability, passenger liability specifically protects the operator against claims arising from injuries or fatalities suffered by ticket-holding passengers while they are boarding, on board, or disembarking the aircraft.

- Because courts often award substantial settlements for passenger injuries, this represents a significant portion of an airline's risk. Commercial operators are required by international treaties (like the Montreal Convention) and local laws to carry minimum levels of passenger liability coverage.

Cargo and Mail Liability

Aircraft transport highly valuable goods, from sensitive pharmaceuticals and electronics to priority mail.

- This coverage protects the airline if the cargo or mail is lost, damaged, delayed, or destroyed while in their care. It applies not just during the flight, but usually from the moment the airline takes possession of the goods until they are delivered to the recipient at the destination.

Combined Single Limit (CSL)

In aviation insurance, policies are rarely split into separate, rigid caps for each category (e.g., \$5 million for property, \$5 million for passengers). Instead, they are usually structured as a **Combined Single Limit (CSL)**.

- **How it works:** A CSL provides one massive, overarching pool of money per occurrence—for example, \$50 million per incident.
- **The advantage:** It gives the insured maximum flexibility. If a crash causes \$40 million in property damage but no passenger injuries, the entire \$50 million limit is available to cover the property damage. It simplifies claims and prevents situations where an operator is underinsured in one specific category despite having plenty of overall coverage.

Loss of Use Insurance: Compensates the lessor for lost lease income if the aircraft is grounded due to severe damage.

Loss of Use Insurance (Lessor Focus)

In the aviation industry, aircraft are high-value, income-generating assets. While standard Hull Insurance covers the physical cost to repair a damaged aircraft, it does not replace the revenue lost while the aircraft sits in a hangar waiting for parts or repairs.

For an aircraft lessor (the company that owns the plane and leases it to an airline), an Aircraft on Ground (AOG) scenario creates massive financial exposure. Loss of Use Insurance acts as a financial bridge, ensuring the lessor continues to receive cash flow when their asset cannot generate income.

Here is how the coverage breaks down in practice:

The Core Problem: Lease Interruption

Aircraft leases (often dry leases) dictate the terms of payment between the airline and the lessor.

- If an aircraft suffers severe damage (e.g., a hard landing, a tug collision on the tarmac, or an engine fire) and requires months of repairs, the lease agreement may contain a clause that pauses rent payments until the aircraft is airworthy again.
- Even if rent pauses, the lessor still has to service the debt (mortgages or investor payouts) on that \$50M–\$150M asset. Loss of Use insurance steps in to replace that missing lease income.

Triggers for Coverage

Loss of Use coverage is directly tied to physical damage.

- **The physical damage prerequisite:** To claim Loss of Use, the grounding must be the direct result of an event covered by the primary Aviation Hull Insurance policy.
- If the aircraft is grounded for reasons *other* than sudden physical damage, this policy will not pay out.

Payout Structure (Mechanics)

Unlike property damage which is assessed based on repair bills, Loss of Use is paid out based on time and agreed-upon values.

- **Waiting Period (Deductible):** The policy does not pay from day one. There is typically a "waiting period" or "franchise" (often 14, 30, or 60 days) after the damage occurs. The lessor must absorb the lost income during this initial window.
- **Daily Indemnity:** Once the waiting period passes, the insurer pays a pre-agreed daily rate (e.g., \$15,000 per day). This rate is carefully calculated during underwriting to mirror the actual daily lease rate of the specific aircraft.
- **Maximum Limit:** The policy will cap the payouts either by a maximum total dollar amount or a maximum number of days (e.g., up to 180 or 360 days of downtime).

Key Exclusions (What is NOT Covered)

It is highly specific in what it covers, and lessors must navigate strict exclusions:

- **Regulatory Groundings:** If an aviation authority (like the FAA or EASA) grounds an entire fleet type due to a design flaw (e.g., the Boeing 737 MAX grounding), Loss of Use insurance does *not* cover this. It only covers individual aircraft damage.
- **Routine Maintenance and Supply Chain Delays:** If an aircraft is stuck in a heavy maintenance check (C-check or D-check) longer than expected because a normal part is backordered, the policy will not trigger.
- **Total Loss:** If the aircraft is completely destroyed (a Total Loss or Constructive Total Loss), the Hull Insurance policy pays out the full agreed value of the aircraft, and the lease is terminated.

Loss of Use typically ceases at the moment the aircraft is declared a total loss, as there is no longer a repair period to wait out.

Spares and Deductible Insurance: Provides coverage for uninstalled engines and parts, and helps operators manage the financial burden of large out-of-pocket deductibles associated with primary hull claims.

Spares and Deductible Insurance

While standard Hull and Liability policies cover the aircraft while it is operating, airlines and operators face two major blind spots: the massive inventory of unattached components required to keep a fleet flying, and the crushing out-of-pocket costs of primary insurance deductibles. This specialized policy bundles these two distinct exposures.

Here is how the two components break down in practice:

Spares Insurance (Uninstalled Equipment)

Aviation maintenance requires a highly expensive inventory of spare parts, ranging from minor avionics components to \$20 million spare engines. Primary Aircraft Hull Insurance only covers parts when they are physically attached to the insured aircraft.

- **Coverage Scope:** Spares insurance protects uninstalled equipment (engines, Auxiliary Power Units (APUs), landing gear assemblies, and routine parts) against physical loss or damage.
- **Transit and Storage:** This coverage applies whether the parts are sitting in a maintenance hangar, stored in a third-party warehouse, or in transit (e.g., shipping a replacement engine on a cargo flight to repair an AOG—Aircraft on Ground—on another continent).
- **The "Attachment" Handoff:** Once a spare engine is bolted onto an aircraft, it typically falls under that aircraft's primary Hull policy. If it is removed, it falls back under the Spares policy. Because airlines frequently pool and swap engines, this seamless handoff is critical to ensure a multi-million-dollar asset is never uninsured.

Deductible Insurance (Deductible Buy-Down)

Commercial aviation hull policies come with staggering deductibles to prevent operators from filing claims for every minor scratch. A standard airline hull deductible can range from \$500,000 to over \$1 million per incident.

- **The Cash Flow Problem:** If a baggage cart strikes an aircraft fuselage causing \$1.5 million in damage, an airline with a \$1 million deductible must pay that first \$1 million entirely out of pocket. For many operators, unexpectedly absorbing a million-dollar cash hit can severely impact quarterly financials.
- **How it Works:** Deductible Insurance acts as a secondary policy that covers the gap left by the primary deductible. For example, an operator might buy Deductible Insurance to cover \$900,000 of their \$1 million primary deductible. In the event of a claim, the operator's true out-of-pocket cost is reduced to just \$100,000.

- **Frequency vs. Severity:** Primary hull policies are designed for catastrophic, severe losses (total hull loss). Deductible insurance protects the airline against high-frequency, lower-severity events—often referred to as "hangar rash" or ground handling incidents—ensuring that routine operational accidents do not drain the company's liquid capital.

Documentation Prerequisites and Management

- **Finance and Lease Endorsements (e.g., AVN67 / Breach of Warranty):** These clauses are a strict pre-delivery documentation requirement. They protect the lessor's and financiers' financial interests, ensuring the policy pays out to them even if the lessee acts in a way that invalidates their own coverage.
- **Pre-Delivery Verification:** The lessee cannot execute the Certificate of Acceptance or begin operations until all insurance certificates and specific endorsements are fully documented, active, and verified to align perfectly with the lease covenants.

Aircraft Lease Insurance Related Considerations

Sofema Aviation Considers the key aspects of Aircraft related Insurance Processes and Products

Introduction

Aircraft leasing relies on sophisticated insurance frameworks to protect the massive capital investments of lessors and the operational viability of lessees.

- The specific leasing structure, whether
 - An operating lease (shorter term, where the aircraft is returned to the lessor) or
 - A finance lease (long-term financing leading to ownership)
- dictates the precise allocation of financial risk, but both structures demand a comprehensive approach to identifying, mitigating, and managing aviation exposures.

Core Exposures and Insurance Mitigations

Aviation operations present high-severity risks. The insurance suite deployed in a leasing arrangement maps directly to specific operational and financial exposures through carefully tailored policies.

Hull Insurance for Physical Asset Loss: Accidents, severe weather, ground collisions, or total destruction of the airframe directly threaten the physical asset.

- Hull insurance reimburses the owner (lessor) for the agreed value or repair costs of the damaged aircraft, securing the underlying capital investment.

Liability Insurance for Third-Party Exposures: Aircraft operations carry the inherent risk of causing bodily injury or property damage to passengers, crew, or entities on the ground.

- Liability coverage provides for legal defense costs, settlements, and damages, shielding both the lessee and the lessor from catastrophic legal liability.

War Risk Insurance for Geopolitical Threats: Given the global nature of aviation, standard policies often exclude acts of war, terrorism, hijacking, confiscation, or politically motivated sabotage.

- War risk insurance overrides these standard exclusions, ensuring the asset remains covered when operating in or near volatile regions.

Loss of Use Insurance for Cash Flow Protection: If an aircraft is grounded due to damage or repairs, an airline's revenue stops, which can threaten lease payments.

- Loss of use insurance compensates the lessor for this lost lease income while the aircraft is inoperable, ensuring uninterrupted cash flow.

Deductible Insurance for Out-of-Pocket Costs: Major hull or liability claims often trigger massive deductibles.

- Deductible insurance covers the lessee's deductible obligations, preventing a sudden liquidity crisis following an incident and ensuring repairs can proceed without delay.

Critical Challenges in Lease Insurance

Navigating aircraft insurance involves managing highly dynamic variables that can leave parties exposed if not properly addressed.

Jurisdictional Complexity: Aircraft cross international borders daily.

- Ensuring that liability limits meet the regulatory requirements of every jurisdiction the aircraft enters, while also satisfying the lessor's minimum requirements, is a constant logistical challenge.

Dynamic Asset Valuation: The value of an aircraft fluctuates based on market conditions, maintenance status, and age.

- If the "agreed value" in a Hull Insurance policy is not regularly updated, the aircraft may become over-insured (wasting premium) or under-insured (leaving the lessor exposed in a total loss).

Sanctions and Volatile War Risks: Geopolitical instability can cause insurers to suddenly issue notices of cancellation for War Risk coverage in specific regions.

- Lessors and lessees must react within strict timeframes (often 7 to 14 days) to secure alternative coverage or ground the aircraft to avoid an uninsured total loss.

Contingent Liability: If a lessee fails to maintain the required insurance, the lessor can be held vicariously liable for an accident simply by virtue of owning the asset.

Best Practices for Structuring and Management

To navigate these challenges, lessors and lessees must implement robust contractual and administrative safeguards within the policy architecture.

Mandate the Breach of Warranty Clause

This is the ultimate safety net for the lessor.

- Also known as a "severability of interest" clause, it stipulates that if the airline (lessee) voids the insurance policy, for example, by flying into a restricted war zone or failing to perform mandatory maintenance, the insurer will still pay out the claim to the lessor.
- It insulates the owner from the operator's negligence.

Implement Joint Insured Status

Both the lessor and the lessee must be named as insured parties on the primary policies.

- This dual status ensures both entities have a direct right to claim benefits and prevents the insurer from subrogating (seeking to recover claim costs) against the lessor for an accident caused by the lessee.

Establish Rigorous Compliance Tracking

The lease agreement must outline explicit, non-negotiable insurance parameters.

- Lessors should require broker-issued Certificates of Insurance (COIs) and Letters of Undertaking (LOUs) prior to delivery and at every annual renewal.
- Best practice involves using dedicated asset management teams to track expiration dates, verify that minimum liability limits are met, and ensure no unauthorized exclusions have been added.

Execute Continuous Policy Review

Because the aviation industry is subject to rapid regulatory shifts and emerging risks, policies cannot be static.

- Stakeholders should conduct quarterly or bi-annual reviews of the policy language, adjusting agreed hull values to match current appraisals and auditing the geographic limits to reflect the airline's actual flight routes.

Optimising Aircraft End of Lease Return Conditions – Protecting the Operators

Sofema Aviation (SA) Considers best practices for the CAMO to manage the technical records and maintenance status to minimise disputes regarding maintenance reserves and return conditions?

Introduction

To mitigate severe end-of-lease financial penalties, the Continuing Airworthiness Management Organisation (CAMO) should execute a structured, multi-year redelivery project focused on absolute technical record integrity and strict adherence to the lease's specific return conditions.

- Because the majority of redelivery issues and unbudgeted costs stem from poor lessee planning, CAMO must treat the lease return as a major engineering project rather than a routine maintenance event.

Executing a Proactive Redelivery Timeline The process of gathering and accepting aircraft technical records can take anywhere from a few weeks to several months, and any gaps or disconnects will cause costs to grow rapidly.

- **24 Months Prior:** The operator should initiate the preparation process by taking a holistic view of the lease return conditions, including a review of engine performance and major component return requirements.
- **15 to 12 Months Prior:** Perform a detailed analysis of all return conditions to identify potential technical or commercial issues while there is still time to evaluate options and implement mitigations.
- **12 to 9 Months Prior:** Identify and assign the Maintenance, Repair, and Overhaul (MRO) facility that will perform the final check and lease return maintenance tasks.
- **6 to 5 Months Prior:** Begin preparing the redelivery aircraft records (in hardcopy or digital format) and clearly define the technical work scope for the redelivery maintenance input.
- **4 to 3 Months Prior:** Present all historical aircraft records to the lessor for advanced review, allowing time to resolve queries before the final handover.

Managing Back-to-Birth (BTB) Traceability and LLPs Documentation issues sit at the very top of the list of end-of-lease anomalies. Lessors require absolute certainty regarding the lifespan of Life Limited Parts (LLPs) to protect the asset's resale value.

- CAMO must deliver full BTB traceability for all LLPs, which requires the original OEM Production Conformance Certificate or an EASA Form 1 / FAA 8130-3.
- The records must include a sequential history of all operators or MROs the component has passed through, a certified record of the hours the part has been on the wing, and a non-incident/accident clearance statement.
- Airworthiness Directive (AD) and Service Bulletin (SB) compliance must be supported back to birth by original "Dirty Fingerprint" (DFP) task cards.

Controlling Repair and Modification Data Modifications and non-standard repairs are heavily scrutinized by lessors because they can impact the transferability of the aircraft to future operators.

- CAMO must supply DFP documentation for the certification of each repair, including material certification and full traceability.
- Any repeat inspections dictated by a repair must be demonstrably recorded and tracked within the Aircraft Maintenance Program (AMP).
- Parts Manufacturer Approval (PMA) parts and Designated Engineering Representative (DER) repairs are typically precluded by the lease terms. Leasing companies actively avoid them because non-OEM components or DER repairs can artificially deflate aircraft value and create regulatory hurdles in other global jurisdictions.

Engine Preparation and Borescope Inspections The single item that typically incurs the greatest cost during a lease return is the engines, with unexpected shop visits easily running into hundreds of thousands or millions of dollars.

- CAMO should schedule a preliminary engine and APU borescope inspection 6 to 4 months prior to the return date. This provides the operator with sufficient time to respond to adverse findings and source parts.
- It is considered best practice to invite the lessor's representatives to witness these borescope inspections.
- The engine records package must include an EASA Form 1 or FAA 8130-3 with a dual release for every non-new component installed during the lease, along with the last six months of Engine Condition Monitoring data and tech log entries.
- CAMO must be prepared to rebuild the aircraft's records to meet the lessor's specific presentation requirements, as the delivery binder format demanded by the lessor is often completely different from how the lessee managed the records operationally.

Triggers for an ACMI Contract and Handling Short Notice Starts within the EASA Framework

Sofema Aviation (SA) Considers key elements related to Aircraft Lease Management

Introduction

An ACMI (Aircraft, Crew, Maintenance, Insurance) or "wet lease" contract is typically triggered by immediate or strategic capacity requirements.

- Primary triggers include
 - Sudden operational disruptions such as an Aircraft on Ground (AOG) scenario,
 - Unexpected late delivery of new aircraft from manufacturers,
 - Planned heavy maintenance schedules that require temporary fleet substitution, and
 - Seasonal demand peaks or new route testing.

Handling short-notice ACMI starts within the European Aviation Safety Agency (EASA) regulatory framework, specifically governed by Regulation (EC) No 1008/2008 Article 13, requires proactive compliance management to avoid operational bottlenecks.

REGULATION (EC) No 1008/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 September 2008 - Article 13 Leasing

1. Without prejudice to Article 4(c), a Community air carrier may have one or more aircraft at its disposal through dry or wet lease agreement.

- Community air carriers may freely operate wet leased aircraft registered within the Community except where this would lead to endangering safety.*
- The Commission shall ensure that the implementation of such a provision is reasonable and proportionate and based on safety considerations.*

2. A dry lease agreement to which a Community air carrier is a party or a wet lease agreement under which the Community air carrier is the lessee of the wet-leased aircraft shall be subject to prior approval in accordance with applicable Community or national law on aviation safety.

3. A Community air carrier wet leasing aircraft registered in a third country from another undertaking shall obtain prior approval for the operation from the competent licensing authority. The competent authority may grant an approval if:

(a) the Community air carrier demonstrates to the satisfaction of the competent authority that all safety standards equivalent to those imposed by Community or national law are met; and

(b) one of the following conditions is fulfilled:

(i) the Community air carrier justifies such leasing on the basis of exceptional needs, in which case an approval may be granted for a period of up to seven months that may be renewed once for a further period of up to seven months;

(ii) the Community air carrier demonstrates that the leasing is necessary to satisfy seasonal capacity needs, which cannot reasonably be satisfied through leasing aircraft registered within the Community, in which case the approval may be renewed; or

(iii) the Community air carrier demonstrates that the leasing is necessary to overcome operational difficulties and it is not possible or reasonable to lease aircraft registered within the Community, in which case the approval shall be of limited duration strictly necessary for overcoming the difficulties.

4. The competent authority may attach conditions to the approval. Such conditions shall form part of the wet lease agreement.

- The competent authority may refuse to grant an approval if there is no reciprocity as regards wet leasing between the Member State concerned or the Community and the third country where the wet-leased aircraft is registered.*
- The competent authority shall inform the Member States concerned about an approval it has granted for wet leasing aircraft registered in a third country*

Intra-EU Wet Leasing: EASA operators can freely operate wet-leased aircraft registered within the Community.

- To handle short-notice starts effectively, competent operators typically maintain a "white list" of pre-assessed, EASA-approved ACMI providers.
- By securing a general approval from their National Aviation Authority (NAA) for operators on this list, airlines can activate a short-notice wet lease with minimal friction
 - sometimes only requiring a notification to the authority 30 minutes prior to the flight.

Third-Country Wet Leasing: For aircraft leased from operators outside the EU, the regulatory hurdle is higher.

- Short-notice approvals are permitted strictly to overcome immediate operational difficulties, such as an AOG event, to reduce passenger delays.
- These leases are typically capped at a short duration (e.g., up to 7 months) and require the lessee to demonstrate "exceptional needs" to the regulatory authority. Furthermore, the lessee must verify that the third-country operator complies with EASA safety standards and EU insurance requirements.

Integrating Safety into Top Management Strategy and Mitigating Due Diligence Failures

To convince top management that safety and rigorous technical due diligence are not roadblocks, they must be framed as essential financial protection mechanisms.

- In aircraft leasing, the lessee assumes the risk of the aircraft's condition upon acceptance, meaning any undetected safety or maintenance issue immediately transitions from a technical problem into a direct financial liability.
- Presenting safety as a shield against catastrophic unbudgeted expenses is the most effective way to secure executive buy-in. You can reference the file

Case Study 1: The "Hell or High Water" Lease Disaster

An airline entered into a 5-year lease for a Boeing 737-300 under a non-cancelable "Hell or High Water" contract, meaning the lessee was obligated to make payments regardless of any difficulties encountered.

- The airline's management expedited the acceptance process, treating technical due diligence as a roadblock, and signed the certificate of acceptance confirming the aircraft met delivery conditions.
- Several days later, the control cable for the right elevator snapped in flight.
- Subsequent inspections revealed massive corrosion and 163 other defects, prompting the Civil Aviation Authority (CAA) to withdraw the Certificate of Airworthiness and ground the aircraft.
- When the airline stopped paying rent, claiming the lease was frustrated, the lessor sued.

- The court ruled in favor of the lessor, determining that the signed acceptance certificate acted as conclusive proof that the aircraft met delivery conditions, leaving the airline financially responsible for a grounded, unusable asset for the duration of the 5-year lease.

Case Study 2: Unbudgeted End-of-Lease Penalties

The majority of financial issues encountered during the redelivery process trace directly back to poor planning and inadequate technical oversight by the lessee.

- An airline returning multiple aircraft took the view that they were technically compliant with standard regulations and failed to assign a dedicated lease return project manager.
- The executive team viewed strict adherence to lease return conditions as an unnecessary expense and failed to share these specific requirements with the engineering team.
- Because minimum return lease obligations were not monitored, an engine failed to meet the return conditions, resulting in a protracted delay and a multi-million dollar shop visit.
- The extended downtime created a cascade of unbudgeted costs, additional lease payments, and litigation, completely eroding the airline's profit margins.

How is Sustainability Impacting Aircraft Leasing?

Sustainability is now a core driver of asset valuation, lease structuring, and capital allocation. Lessors no longer merely evaluate an airline's financial health; they heavily scrutinize its carbon intensity, Sustainable Aviation Fuel (SAF) readiness, and overall ESG compliance.

Sofema Aviation Takes a Deep Dive into the Core Issues

The Operator's Burden: Bearing the Direct Costs of Compliance

Regulatory & Carbon Pricing Expenses: Airlines are directly absorbing the escalating financial impacts of carbon monitoring and offset frameworks.

- Under the EU Emissions Trading System (ETS), free carbon allocations for aircraft operators are shrinking by 25% in 2024 and 50% in 2025, culminating in full auctioning by 2026.
- Simultaneously, ICAO's CORSIA framework requires international aeroplane operators to monitor, report, and verify emissions, and purchase eligible emission units to offset growth above baseline targets.

Fuel Premiums and SAF Mandates: Fuel remains the single largest expense in aviation, meaning the operation of older, inefficient aircraft heavily penalizes an airline's bottom line and incurs higher regulatory risk.

- While the EU has reserved 20 million ETS allowances to help cover the price gap between conventional fossil fuels and eligible alternative aviation fuels, operators must still absorb substantial costs.

- Legally binding Sustainable Aviation Fuel (SAF) requirements are being enforced in jurisdictions including the EU, Indonesia, and Brazil, forcing operators to factor permanent SAF premiums into their cost structures.

"Green Alignment" and Lease Penalties: Lease agreements have evolved beyond pure finance, now embedding emissions monitoring and data reporting clauses as standard practice.

- Non-compliant airlines face higher operating costs, increased scrutiny from financiers, and potential contractual penalties for excessive carbon intensity or reporting failures.
- Conversely, airlines that demonstrate measurable carbon reductions, adopt SAF, and improve ESG transparency can achieve "green alignment" a dynamic that rewards them with potentially reduced lease margins or lower interest rates.

The Lessor's Imperative: Environmental Face and Asset Preservation

Capital Access & ESG Scrutiny: For leasing companies, environmental efficiency is no longer just a corporate virtue; it is an economic safeguard where the cost of climate inaction easily outweighs the cost of transition.

- A lessor's ability to raise funds or refinance portfolios is increasingly tethered to demonstrating robust sustainability credentials, making Environmental, Social, and Governance (ESG) reporting as critical as traditional credit ratings.
- A technically efficient aircraft can still represent financial risk if its operator lacks transparency or carries social controversies, meaning broader ESG metrics now influence everything from insurance premiums to lease renewals.

Asset Liquidity & Fleet Renewal Targets: Lessors are actively rebalancing their assets because aircraft with lower carbon intensity and SAF compatibility retain stronger secondary-market liquidity and command premium lease rates.

- Many leasing firms are setting public targets to ensure the majority of their fleets are composed of fuel-efficient, new-technology aircraft within the coming years to avoid holding stranded, high-emission assets.
- Lease extensions are also becoming heavily dependent on an individual aircraft's sustainability profile.

Benchmarking & Sustainability-Linked Finance: The leasing industry relies on specific transparency tools to prove environmental progress to institutional investors.

- The Aircraft Leasing Ireland (ALI) Sustainability Charter assists members in embedding ESG practices, building reporting frameworks, and aiming for net zero by 2050 through SAF and alternative propulsion research.
- Furthermore, tools like the 2024 Aircraft Lessor Sustainability Index allow lessors to benchmark their portfolio composition and environmental performance against peers using comprehensive, flight-level emissions data.

- To fund this transition, Sustainability-Linked Financing (SLF) has become a primary vehicle for the global finance industry to assist the sector in reaching its decarbonization targets.

Fleet Renewal and Residual Value Risks

The most immediate physical impact of sustainability is the accelerated pivot toward fuel-efficient aircraft. Lessors are actively rebalancing portfolios to mitigate the residual value risks associated with older models.

Asset Liquidity: Aircraft with lower carbon intensity command premium lease rates and broader placement flexibility.

- Conversely, older aircraft face diminished financing options, potential placement challenges, and accelerated depreciation as governments tighten emissions caps.

Targeted Rebalancing: Lessors are committing to hard modernization targets.

- For example, CDB Aviation implemented a Sustainable Fleet Initiative aiming for 80% of its fleet to comprise the lowest-emission aircraft by 2030.
- Similarly, ABL Aviation supported Air France's fleet renewal by delivering fuel-efficient Airbus A220-300s to meet sustainability goals.

The Rise of Sustainability-Linked Financing

Access to capital in aviation is increasingly dependent on robust ESG credentials. Institutional investors and banks tie the cost of capital directly to environmental progress via Sustainability Performance Targets (SPTs).

Green Loans and Bonds: In 2021, Korean Air issued \$167 million in Green Bonds specifically to finance "eco-friendly" Boeing 787s.

- Deutsche Bank provided secured a Green Loan from to lease ATR 72-600s, utilizing Green Loan Principles focused on climate change mitigation.

Innovative Lease Structures: In 2022, Air France utilized a Sustainability-Linked JOLCO (Japanese Operating Lease with Call Option) for an A350, incorporating ESG metrics into both debt and equity for the first time.

Margin Adjustments: Jet2 executed a sustainability-linked revolving credit facility where terms were directly tied to reducing grams of CO2 per passenger kilometer, SAF uptake, and fleet renewal goals.

Contractual "Green Alignment" in Leases

Lease agreements are evolving to incentivize sustainable operations, embedding ESG pressure points directly into commercial contracts.

- **Emissions Reporting:** Standard lease clauses now frequently mandate emissions monitoring, data reporting, and compliance with frameworks like the EU Emissions Trading System (ETS) and ICAO's CORSIA.

- **Financial Incentives:** Through "green alignment," an airline may earn a lower lease margin if it demonstrates measurable carbon reductions or adopts SAF. Conversely, failing to meet standards can trigger penalties or tightened terms.

Early Investment in Next-Gen Technologies

Lessors are looking beyond current fleet renewals to position themselves for Net Zero 2050 commitments, investing heavily in future propulsion and fuel alternatives.

- **SAF and Alternative Propulsion:** Initiatives like the Aircraft Leasing Ireland (ALI) Sustainability Charter highlight a collaborative push toward SAF and clean technology. Lessors are also exploring alternative tech, for instance, CDB Aviation partnered with Heart Aerospace to invest in hybrid-electric aircraft development.
- Environmental efficiency is no longer just a virtue in aircraft leasing; it is a fundamental economic safeguard. The cost of climate inaction now outweighs the cost of transition for both financiers and operators.