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MRO-PRO Intelligent Workpack Import (IWI)

From customer PDF to structured, executable Base Maintenance workpack

A new approach to one of Base Maintenance planning's most manual processes

MRO-PRO introduces Intelligent Workpack Import (IWI), a major extension to the Base Maintenance Planning platform that transforms how an MRO receives and processes an airline or operator maintenance workpack. Rather than requiring planners to convert a customer's maintenance package into a spreadsheet or manually recreate hundreds of tasks, IWI accepts the complete PDF workpack in its original format and intelligently converts it into a structured MRO-PRO workpack ready for planning and execution.

That matters because a heavy-maintenance input rarely arrives as a neat list of tasks. A single workpack may contain hundreds or thousands of pages: Task Cards mixed with AMM extracts, Engineering Orders, drawings, wiring information, illustrations, job instructions and other supporting technical data. Traditionally, planners must work through that package, identify where tasks begin and end, extract the information required by the MRO system and reorganise the supporting documents before meaningful planning can start. IWI automates much of this process, significantly reducing the manual effort involved in preparing customer maintenance workpacks.
The system learns the document before it reads the task

IWI is not simply OCR applied to a large PDF. The first challenge is understanding the structure of the workpack itself. MRO-PRO separates the uploaded workpack into individual pages and uses Amazon Bedrock to generate AI visual embeddings representing the structural appearance of each page. These allow the system to compare document layouts rather than relying on text alone. AI-driven similarity matching then compares these representations against a continuously evolving Layout Library containing Task Card and Supporting Data formats the system has previously learned.

Visual similarity is combined with an initial OCR analysis of every page, allowing IWI to identify maintenance terminology, document references and pagination. This is particularly important when distinguishing the first page of a Task Card from continuation pages that may look almost identical. By combining visual recognition with textual evidence, IWI can distinguish between potential maintenance tasks and the supporting technical information associated with them.
Where a page confidently matches a previously learned layout, its classification can be reused automatically. Where MRO-PRO encounters an unfamiliar format, visually similar pages are intelligently grouped and presented to the planner for confirmation as either Task Cards or Supporting Data. A second, lower-confidence review layer provides an additional opportunity to identify potential tasks that fall outside the normal recognition thresholds. The approach is deliberately conservative: automation is applied where confidence is high, while the planner retains control over uncertain classifications.

Crucially, this knowledge is reusable. Once a recurring Task Card or Supporting Data layout has been confirmed, its classification becomes part of the permanent Layout Library and can be recognised automatically in future workpacks. IWI learns both what a Task Card looks like and what it does not look like, progressively reducing the need for repetitive document classification.

Teach IWI once. Let it learn the rest.

Recognising a Task Card is only the beginning. IWI must also understand how the document represents the maintenance information required by MRO-PRO. Different airlines and maintenance systems present this information in different ways, and even Task Cards generated by the same system can contain variations in their internal structure. Once the Task Cards have been identified, IWI uses advanced AWS Textract document analysis to read their content, including text, tables, individual cells and Key/Value relationships. Previously trained layouts automatically reuse their existing extraction rules, while unfamiliar layouts can be taught through an interactive training interface.

The user simply highlights the required information on a representative Task Card. IWI determines how best to find that information again.

Behind this straightforward interaction, MRO-PRO evaluates four independent extraction methods:
Key / Value: Identifies information associated with recognised labels, such as Task Number or Task Reference.
Table Cell: Locates information within repeatable table structures, even where the position or surrounding table structure changes.

Anchor: Uses surrounding headings and text to locate information relative to recognisable document features.
Region: Identifies information using its position on the page, providing an additional extraction method where stronger structural relationships are unavailable.

Rather than simply remembering where the user highlighted a value, IWI analyses the underlying document structure and evaluates which extraction methods are repeatable across other Task Cards sharing the same layout. The most suitable method is selected as the preferred extraction strategy, while other usable methods are retained as alternatives.

The resulting rules are stored permanently against the recognised layout. When another Task Card using that layout is encountered, MRO-PRO can automatically extract its Task Number, Task Reference, Title and Description, together with additional supported information such as ATA Chapter and Man Hours.
This creates a second layer of reusable intelligence within IWI. The Layout Library does not merely remember what documents look like; it also remembers how to read them. Once a layout has been successfully trained, its extraction knowledge can be applied to equivalent Task Cards in subsequent workpacks without repeating the original training process.

Intelligent extraction that adapts to document variations
One of the most significant technical developments within IWI is its ability to accommodate inconsistencies in how maintenance documents are interpreted.

Even Task Cards with extremely high visual similarity can produce different OCR results. For example, a maintenance description might be recognised as a Key/Value relationship on one Task Card, a table cell on another and ordinary text on a third. Information may also move within the document as preceding maintenance instructions, material requirements or tables expand and contract.

A conventional extraction system dependent on a single predefined rule could fail when the expected structure was unavailable, despite the required information remaining clearly visible on the document.

IWI addresses this through a multi-method extraction architecture. Each field has a preferred extraction method, together with independently trained alternatives. If the preferred method cannot locate usable information on a particular Task Card, IWI automatically attempts the next available method.

For example, a Task Description normally extracted through a recognised Key/Value relationship may instead be recovered through a repeatable table structure or surrounding text anchors when the expected relationship is missing. Each method maintains its own extraction and text-processing rules, allowing IWI to adapt without applying inappropriate assumptions from one extraction technique to another. This approach improves resilience across real-world maintenance documents while preserving the structural relationships established during training.

Importantly, users can preview extracted information against the original Task Cards, review different examples within the same layout and refine training where necessary. The system combines automated document interpretation with

human verification, allowing planners to establish confidence in the information before constructing the final workpack.

Three straightforward steps from PDF to workpack
Despite the sophistication of the underlying technology, IWI presents the user with a straightforward three-step workflow.

Step 1 – Upload & AI Analysis
The planner uploads the complete maintenance workpack as a single PDF, preserving the original sequence of Task Cards and their associated Supporting Data. MRO-PRO separates the document into individual pages, uses AI to identify visually similar layouts and performs an initial text analysis to recognise maintenance terminology, pagination and potential Task Cards.

Step 2 – Identify Task Cards
IWI presents the recognised document layouts in four categories: Layouts Matched, AI Matched, User Review and Not Matched. Previously learned layouts can be recognised automatically, while the planner confirms whether unfamiliar or uncertain layouts represent Task Cards or Supporting Data. Any genuine Task Card missed during automatic recognition can also be recovered. These decisions become reusable knowledge for future imports.

Step 3 – Read & Create Workpack
MRO-PRO performs detailed OCR analysis of the confirmed Task Cards and applies previously trained extraction rules. The planner reviews the extracted information and trains any new layouts by highlighting the required maintenance fields. Once all required layouts have been trained, IWI extracts the task information and constructs the completed Base Maintenance workpack, including its associated technical documentation.
The result is a process in which user involvement becomes increasingly focused on new or unusual document formats. As the Layout Library grows, previously recognised and trained layouts can be processed with progressively less manual intervention.

Workpack reconstruction – not just data extraction
The final stage is what turns IWI from a document-reading tool into a complete workpack-construction engine.
MRO-PRO processes the original package in sequence, identifies where each maintenance task begins and associates the subsequent pages with that task until the next recognised task begins. The original PDF pages are then reconstructed into individual Task and Supporting Data documents and linked directly to the corresponding MRO-PRO maintenance task.

The reconstruction process works directly from the original source PDF, preserving the quality of the original documentation rather than rebuilding it from OCR text. The architecture has also been designed with large maintenance inputs in mind, using asynchronous processing and background construction jobs to manage workpacks containing hundreds or thousands of pages.

The result is not merely an imported task list. It is a structured Base Maintenance workpack in which the task information, original maintenance instructions and associated supporting technical documentation have been identified, organised and attached to the appropriate maintenance records.

This document structure also establishes a foundation for future digital execution and electronic certification of customer Task Cards within MRO-PRO.

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A step change in planning efficiency

Preparing a large customer maintenance workpack can consume many hours of planner effort and, for particularly complex maintenance inputs, potentially several days. The traditional process involves identifying individual Task Cards, extracting their information, reorganising supporting documents and manually recreating the resulting tasks within the MRO system.

IWI has been developed to automate much of this preparation, replacing repetitive document handling with intelligent recognition, reusable extraction rules and automated workpack construction.

Instead of manually dissecting and rebuilding the customer's workpack, the planner uploads the original PDF, confirms the proposed Task Card classifications, reviews or trains the required document layouts and receives a structured MRO-PRO workpack ready for the existing planning process.

The time required will naturally vary according to workpack size, document complexity and the number of previously unseen layouts requiring training. However, the most significant efficiency opportunity comes from the system's ability to retain and reuse what it has already learned.

For an MRO organisation processing recurring maintenance inputs from the same airlines, operators or maintenance management systems, previously classified and trained layouts can be recognised and interpreted automatically. The initial effort invested in teaching IWI a document format can therefore benefit subsequent workpacks containing the same structure.

The benefit extends beyond reducing administrative effort. IWI creates a consistent digital structure, preserves the relationship between maintenance tasks and their supporting technical records, reduces repetitive data entry and allows planning intelligence to begin earlier in the maintenance input.

From PDF to planning intelligence

Intelligent Workpack Import represents an important advancement in MRO-PRO's Base Maintenance strategy, moving beyond simply storing and managing digital workpacks towards software capable of understanding how those workpacks are constructed.

Once IWI has completed the import, the resulting Tasks enter the same Base Maintenance planning workflow used by tasks created through Bulk Upload, History or Manual Add. There is no separate planning process. Imported tasks can immediately benefit from MRO-PRO's existing AI Task Matching, historical maintenance intelligence, metadata enrichment, NRC prediction and forecasting of labour, parts, tooling, services and equipment.

The underlying architecture brings together AI visual recognition, document understanding, reusable layout learning, intelligent extraction and automated PDF reconstruction within a single integrated workflow.

IWI recognises unfamiliar maintenance documents, learns how to extract their information and reconstructs them into structured, executable Base Maintenance workpacks.

As additional document layouts are encountered and trained, that knowledge becomes part of MRO-PRO's permanent Layout Library, progressively increasing the system's ability to recognise and interpret future maintenance inputs.
The result is a fundamentally different approach to workpack preparation: one in which the customer's original maintenance documentation becomes the starting point for intelligent, data-driven Base Maintenance planning.