

Predator Travelers™ - White Paper

Features and benefits for electronic work instructions on the manufacturing shop floor

Abstract

This paper outlines the specific features and benefits of implementing a Predator Travelers based solution to automate work instructions for manufacturers worldwide. Predator Travelers can be configured to address the unique requirements of each manufacturer with an off the shelf shrink-wrapped software based solution. Every feature, menu, toolbar button and dialog can be configured with a set of permissions per user. Combine this with support for three database platforms; Microsoft Access, SQL Server and Oracle to provide flexibility during the implementation process and an upgrade path as your needs grow.

Predator Travelers runs stand alone or fully integrated with Predator MDC™, Predator Tool Crib™, Predator Gage Crib™, Predator DNC™ or Predator Desktop™. It can optionally utilize the existing DNC network and Predator PPM™ for parametric part manufacturing with compatible CNC machines. Predator Travelers is a member of a suite of applications all designed to share data and resources. They all share a common design and philosophy based on our unique understanding of manufacturing processes. Collectively they are known as Predator SFC™ or shop floor control.

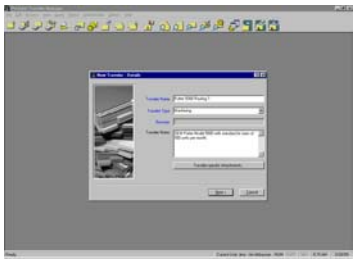
Predator SFC is designed to manage the manufacturing details of every shop floor and can be integrated with a manufacturer's higher level ERP or MES systems to form a seamless management system.

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This document is based on features in Predator Travelers v1.3.

NOTE: Travelers are often called work instructions, packets, tickets, or routers.



32 bit Windows based application

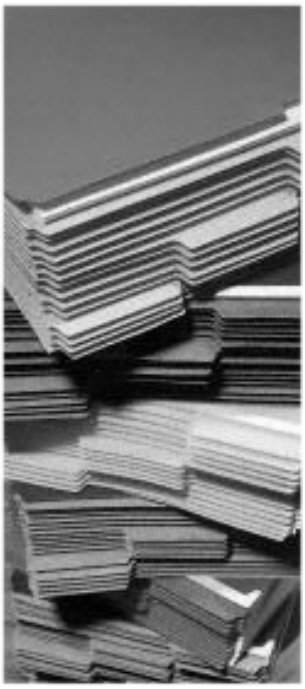
What is Predator Travelers?

Predator Travelers is a software application that creates, organizes, releases, and documents manufacturing details, processes and work instructions electronically. With the motto “You can only improve what you document”, Predator Travelers Manager helps improve manufacturing processes by empowering engineers and shop floor personnel with an interactive method of building and deploying electronic work instructions.

Predator Travelers Manager provides real-time answers to many of manufacturer’s toughest questions, including:

- How do we automate JIT, just in time, production of family of parts?
- How do we consistently implement Kaizen methods during the manufacturing process?
- What processes and resources are required to manufacture each part number?
- What if a new process or resource is used, how many part numbers would it effect?
- What tools, cutters, inserts, gauges, fixtures, machines, materials, inspections, etc, are required per traveler numbers?
- How is outsourced production built? How is outsourced assembly done?
- Are parts being manufactured using the latest revisions, processes and electronic files?
- How are ECNs, engineering change notices, and revisions of manufacturing processes tracked?
- Can setup personnel provide first article feedback to engineering in real-time?
- Can shop floor personnel interactively view the latest traveler/job folder/work order in real-time?
- How do we create and maintain customer specific work instructions?
- How do we achieve or maintain FAA, FDA, ISO 900x, Six Sigma, and OSHA requirements as engineering methods continuously improve?

Answers to all of the above can be solved with Predator Travelers and displayed from any PC with the ability to drill down to any level of detail at any of your manufacturing facilities. For example, a manufacturing engineer in the United States can query the status of a machining process in Mexico and find out the current method and then plan an improved method to be rolled out in the next 3 months. Details are kept indefinitely and current results can be compared with previous methods or processes. Real-time answers leveraged against actual production history are becoming critical as enterprises rely more on their engineering and manufacturing resources as they go global. Answers based on actual manufacturing details facilitate faster decisions and increase productivity for every manufacturer.



Traditionally thousands of files, folders, or pieces of paper are used

Why use Predator Travelers?

Historically manufacturers rely on the memory of personnel, sheets of paper in a manila folder or clear envelope, a PC's directory structure with numerous Word and Excel files, an ERP/MRP's router, or some custom application. Predator Travelers is the first shrink-wrapped, open architecture database application that documents, organizes and maintains your shop travelers or manufacturing processes. Traditional paper or file-based methods tend to be easy to create, but very difficult to maintain. For example, it is not uncommon for manufacturers to try and maintain thousands of individual documents or files for work instructions, tool lists, setup sheets, CNC programs, best practices, Six Sigma processes, machine safety instructions, etc. With thousands of files, how does one improve a process or document an engineering change? Typically these systems quickly fall behind what is really happening out on the shop floor and only stay-up-to-date by very dedicated and motivated personnel. Larger companies that have implemented an MRP/ERP system often start with a generic shop floor router and then are required to add additional files or paper to complete the level of detail required. Predator Travelers uses a highly relational database, which introduces structure, simplified input and automates traveler maintenance to a few mouse clicks. New travelers and revisions to existing travelers can be done by one or more engineers in real-time by running Predator Travelers on a Windows-based PC. Interfaces between Predator Travelers and MRP/ERP systems can be developed and implemented on a time and material basis.

In addition, shop floor personnel are empowered to interactively view a traveler to insure that first article setups are done correctly and that production questions are answered.

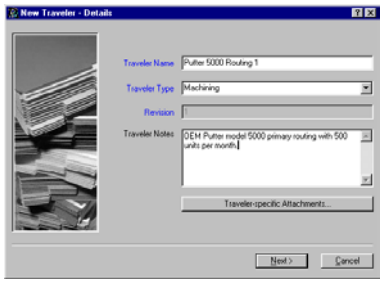
Engineers can continue to design and document improved methods and processes that will be released to manufacturing in the future. All major traveler components include ECNs and revision control. Alternate routings for the same part number allow for completing rush jobs or second shift production. Customer specific travelers can also be used in JIT low volume production and assembly.

An optional family of parts module called Predator PPM, which stands for Parametric Part Manufacturing, bridges Predator Travelers with Predator DNC or Predator Desktop. Predator PPM dynamically modifies CNC programs based on a part number's reference dimensions. Predator PPM can significantly automate the manufacturing process by eliminating the necessity to create individual CNC programs *per part number* by dynamically modifying a single CNC program *per family of parts*. By adding a bar code reader to Predator DNC or Predator Desktop, an operator can trigger the entire process with a single swipe of a bar code.

How does Predator Travelers work?

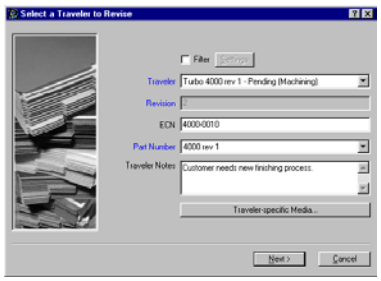
Predator Travelers organizes and maintains all of your traveler or work instruction processes. The following flow diagram provides an overview to Predator Travelers.





Predator Travelers documents, organizes and maintains your manufacturing processes. Traditional methods become very difficult to maintain. Predator Travelers uses a highly relational database, which simplifies input and automates traveler maintenance to a few mouse clicks. Input can be done by one or more engineers in real-time by running Predator Travelers on a Windows-based PC connected to network. Creating a new traveler is a simple process which has been automated with the use of wizards. The dialog on the left is the first step in the wizard. Several steps later and a finished traveler is complete.

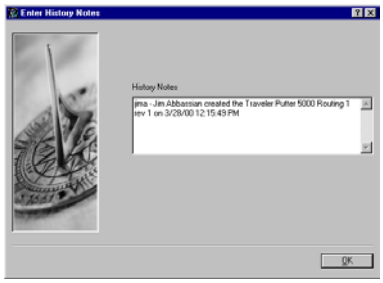
Optionally, each engineer can be responsible for specific areas. For example, Bob heads up the quality department and can be the only one that can create or edit new gauges. While John heads up the tooling department and he has ownership of tools, inserts, cutters and kits.



Travelers support different levels of detail. For example, an assembly process may have just a few operations with a minimal number of specifics, while a machining process may have 50 operations with hundreds of related components and specifics for every tool and insert. There is no limit to the number of components within Predator Traveler. Many customers have tens of thousands of part numbers, travelers, tools, inserts, etc.

Predator Travelers also allows users to assign any electronic file as a reference attachment to any component or to any specific traveler. For example, a streaming video clip of general machine safety instructions can be associated as a reference attachment.

Any operator working with any traveler could then watch the common safety instructions as well as those for the specific CNC machine. This is because Predator Travelers also supports specific attachments. For example, a bitmap of the finished machine setup can be associated as a specific attachment only when the machine is used to manufacture a specific part number.

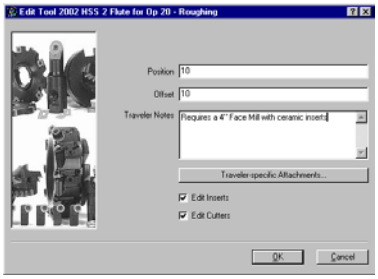


Travelers can be revised as engineering changes are made with complete date and time based history. Alternate travelers can be created to facilitate expedited or backup routings. In addition, travelers can be rolled back or unreleased from the shop floor. All of these processes can be implemented enterprise-wide with date and time based histories automatically completed with just a few mouse clicks.

Predator Travelers can make dramatic changes to a shop's most basic methods. Instead of maintaining a tool list per part # in a file or setup sheet, Predator Travelers can optionally print a tool list report, export an HTML file, or export an Excel spreadsheet. In a paperless environment, an operator (using the Predator Travelers Client) can simply drill down to the appropriate operation number and click on the tools icon. Should a manufacturing engineer desire to change from a 2-flute HHS end mill to a 4-flute coated cobalt end mill, Predator Travelers will first advise the engineer on how many existing travelers and parts numbers would be affected. Second, Predator Travelers would then allow the engineer to revise *all* travelers or a *subset* of the travelers to use the new tool. Depending on the number of part numbers and travelers that must be maintained, Predator Travelers can save weeks as manufacturing processes are improved.

Finally, a complete history of changes is maintained for the lifetime of each traveler and part number. The history of changes provides a complete audit trail of every manufacturing process and every first article setup.

What specific data does Predator Travelers organize?



Predator Travelers is designed to track and organize every aspect of the assembly, fabrication, machining, outsourced, and process based set of work instructions. At a minimum each traveler records standard information in a series of step-by-step operations. Up to 150 fields per traveler and/or operation provide an unparalleled level of detail. The highlights include the following:

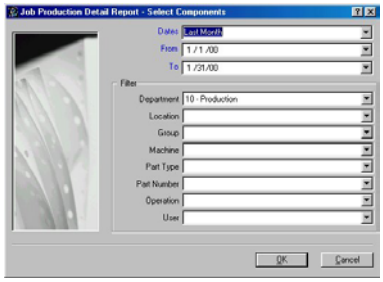
- Traveler Number
- Traveler Revision
- Traveler Name
- Part Type or Family
- Part Number
- Part Revision
- Notes
- Multi-Media Attachments
- Operation number and Name
- Customer number and Name

For every operation, numerous additional details can be added. The highlights include the following:

- Setup Time
- Cycle Time
- Number of Operators
- Operations per Day
- Tear-down Time
- Setup Notes and Work Notes
- CNC programs
- Tool Number, Tool Name, Tool Type, Tool Position and Tool Offset
- Cutter Number, Cutter Name and Quantity Required
- Inserts Number, Insert Name and Quantity Required
- Kit Number and Kit Name
- Material Number, Material Name and Material Type
- Gage Number, Gage Name and Gage Type
- Inspection Number, Inspection Name and Inspection Type

NOTE: An unlimited number of Machines, Tools, Cutters, Inserts, Kits, Materials, Gages and Inspections per Operation are supported.

What kinds of reports are included with Predator Traveler?



88 reports are included standard with Predator Travelers. Highlights include:

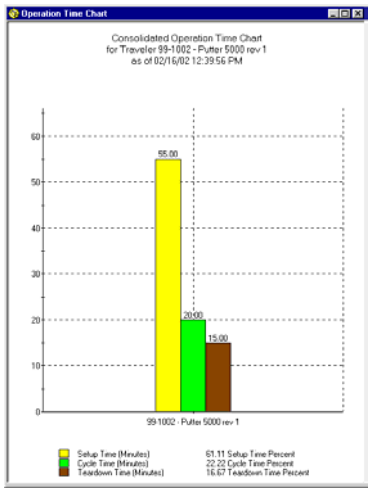
- Traveler Lists
- Traveler Cover Report
- Shop Floor Router Report
- First Article Signoff Report
- Release, Revision, and General Traveler History
- 13 Where Used Reports
- Components per Traveler Report
- Kit Components
- 8 Security Reports
- 27 Component Reports
- 27 Component History Reports

NOTE: Each of the above reports has numerous options and filters to drill down to the appropriate data. For example, the Where Used reports can be filtered to a specific department, location, group and machine.

All reports can be exported to Microsoft Excel or HTML documents for further analysis or processing. Additional Predator Travelers Clients can be licensed just for the shop floor or to view specific reports. Custom reports and graphs are available via several third party report and charting applications such as Microsoft Access, Crystal Reports and

Oracle Reports.

Predator Travelers supports a unique interactive traveler viewer that allows manufacturers to truly run in a paperless environment. Predator Travelers can eliminate the need to create and distribute paper-based travelers. As needed paper-based travelers may be printed for high volume areas that have a just a few part number changeovers.



What kinds of charts are included with Predator Travelers?

4 charts and graphs are included standard with Predator Travelers. Highlights include:

- Operation Time Chart
- Compare Travelers Chart
- Traveler Ranking Chart
- Operations per Traveler Ranking Chart

NOTE: Each of the above charts has numerous options and filters to drill down to the appropriate data. For example, the Traveler Ranking Chart can be filtered to a specific traveler type, and part number with results for cycle time, cycle percent, setup time, setup percent, teardown time, and teardown percent.

All charts can be copied to the clipboard and saved as JPEG graphics. Additional Predator Travelers Clients can be licensed just for the manufacturing engineers to view specific Traveler charts. Custom charts and graphs are available via several third party report and charting applications such as Microsoft Access, Crystal Reports or Oracle Reports.

One of many



Predator Travelers is a stand-alone database driven application built on Predator's common database platform. This common platform is a shared foundation to an entire suite of Predator applications. Shared common data improves overall productivity and minimizes implementation time when adding additional applications. For example, edit a machine's properties and every Predator application is immediately updated including Predator Travelers, Predator MDC, Predator DNC, Predator Desktop, Predator Tool Crib and Predator Gage Crib.

Predator's common database platform is an open architecture structure and independent of the actual database server. Currently, it supports Microsoft Access, SQL Server and Oracle depending on the customer's requirements. Predator's common database platform is fully relational and supports powerful object-based design to support an unlimited number of travelers, parts, personnel, machines, departments, locations, etc.



What are the main features of Predator Traveler?

- Multiple simultaneous users from any Windows based networked PC.
- Powerful object-based database design to support an unlimited number of travelers, parts, operations, departments, machines, tools, blueprints, gages, media, etc.
- Multiple manufacturing plants can be supported within a single Predator Travelers database with reports and charts that span the enterprise or drill down to each plant.
- Open architecture design with native database and SQL query support for Microsoft Access, SQL Server and Oracle.
- Supports assembly, fabrication, machining, process and outsourced based travelers.
- Complete revision tracking of travelers, parts and operations.
- Common components include tools, cutters, inserts, kits, gages, blueprints, inspections, machines, materials, parts, and all associated files and media.
- Includes a formal release and edit in-process travelers process.
- Comprehensive ISO 900x compatible history of edits/changes.
- Easy to use wizards for all traveler processes.
- Edit common components with an automatic traveler update. For example, change a tool and every related traveler that referred to that original tool is updated.
- Query travelers based on where used components. For example, display all travelers that use a particular tool number.
- Linked multimedia can include any file on the network with additional viewers for Microsoft Excel, Word, PowerPoint, RTF, AutoCAD, DXF, HTML, PDF, text and bitmaps included with Predator Travelers.
- Predator Travelers includes a *secure* browser for access to corporate Intranets.
- Includes interactive shop floor traveler viewer.
- Shop floor, setup and administrative printing of travelers and work instructions.
- Automatic database integration with:
  - Predator DNC or Predator Desktop
  - Predator PPM – Parametric Part Manufacturing
  - Predator Gage Crib
  - Predator Tool Crib
  - Predator MDC - Manufacturing Data Collection
- Includes 88 standard traveler management reports.
- Includes 4 standard traveler management charts.
- Custom reports and graphs are available via several third party applications.
- User and group permissions for features, menus, toolbars and dialogs.
- Comprehensive HTML based on-line help that leads the industry.
- Automatic database migration as each software version is released.
- Real-time transaction based processing to minimize database corruption with automatic rollback when power is restored.
- Flexible licensing including SIMs, network cards and floating network licenses.

For More Information

For the latest information on Predator Travelers, check out our World Wide Web site at http://www.predator-software.com