

## KnarrTek Implementation Processes and Services

### Introduction

KnarrTek assists its clients to implement:

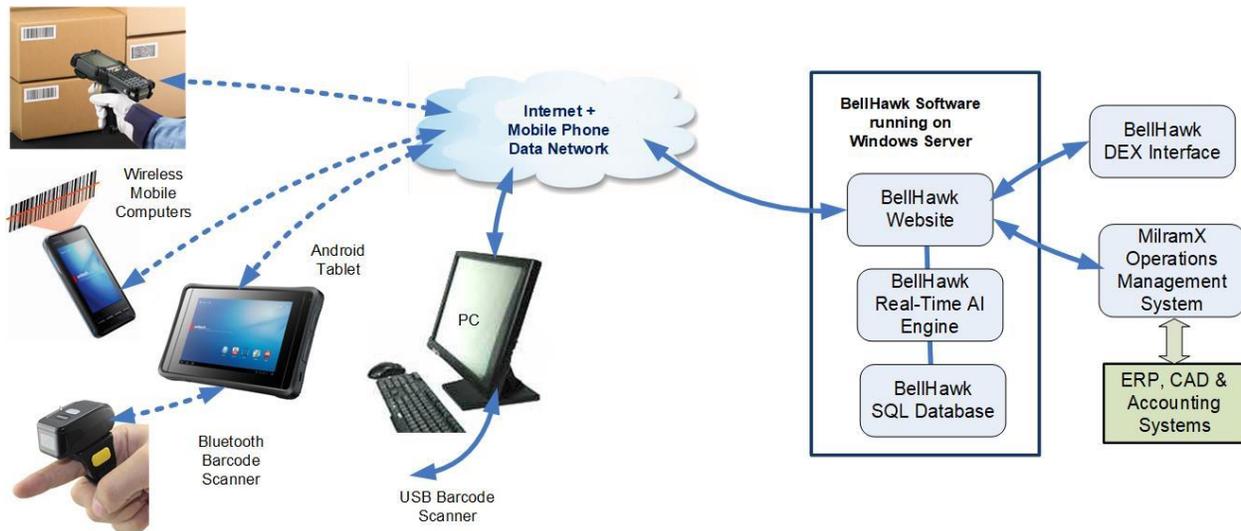
1. Real-time Operations, Materials, and Work-in-Process tracking systems, based on the BellHawk software platform.
2. Operations Management and Decision Support Systems based on the MilramX software platform.

These are often implemented together but can, where appropriate, be implemented separately.

This document describes the systems implementation processes used by KnarrTek and the implementation services provided.

These processes and services recognize that, while our clients have a clear idea as to what they want to achieve, from a management viewpoint, they typically do not have the expertise within their organization to implement these very complex systems.

### Implementing Barcode Tracking Systems



All BellHawk based implementation projects start out with a Pilot project, in which KnarrTek's clients get to use the BellHawk software at no charge, over the Internet, on Windows Servers managed by KnarrTek, as part of KnarrTek's BellHawk Online service. These Pilot projects may last from 30 to 90 days depending on the scope of the tracking project, from simple operations or materials tracking to more complex work-in-process tracking.

During this time, the staff at KnarrTek will assist the client's team to get a BellHawk based system running with the client's own data so that the client's team can experience how their tracking process will work. During this time, clients are expected to pay for the services provided

by the KnarrTek team in working with the client's team, in the form of prepaid support services bundles.

Some of the services provided include:

- Systems design and analysis – assisting the client to map their operations tracking problem onto the best-of-breed tracking processes incorporated into BellHawk. This includes educating managers and their staff in the best ways to solve specific operations tracking problems.
- Assistance with the procurement of barcode scanners, labels, and mobile computers, in small quantities, to use in testing the Pilot system in production or training room environment.
- Assistance with setting up the BellHawk rules and database. BellHawk is a rules-based system that is designed to be used in a wide range of applications. These rules can be tailored to the needs of each client by importing data in the form of Excel spreadsheets. Also, database information, such as for parts, the locations where they may be stored, and the operations that may be performed, are also imported using Excel spreadsheets
- Training and support in the use of the BellHawk software. Here we often use a train-the-trainer method, where we initially train managers and their staff. Then we train supervisors and have them train the material handlers, machine operators, and other production personnel that report to them. This provides the supervisors with the tools they need to assist their people in using the system, when issues arise.
- Modification of standard reports or transactions to meet the specific needs of each client as this moves from a training room pilot installation to a trial deployment in production.
- Training and support in the use of the DEX interface, on a Pilot basis. DEX is an Interface which provides a simplified “mirror” of the BellHawk database in a SQL Server Express database on the user's own PC. This can be used by clients to produce custom reports using a wide range of reporting software packages. It can also be used for bulk imports of setup data into the BellHawk database.

Note that, during the Pilot phase:

- All customer, receiving, work, picking, and ship orders are entered by hand. Subsequently these may be imported through a MilramX based system, where they may be created or imported from accounting.
- There is little or no requirement for involvement with the IT department or external support organization until the Pilot is transferred to full production operation.
- For simplicity, we use preprinted rolls of tracking labels rather than print out barcode labels on barcode label printers. Also, all tracking can be performed using barcoded travelers and picking sheets printed on an office printer, with no special software required.

After the completion of the Pilot phase, clients can:

1. For simple applications, continue to use the BellHawk Online services.
2. For more complex applications, migrate to using BellHawk-in-a-Box, installed at each plant or warehouse. This is generally the preferred configuration for most industrial organizations, where continuity of operations, barcode scanning speed, ability to print out barcode labels, and other such issues are of concern.



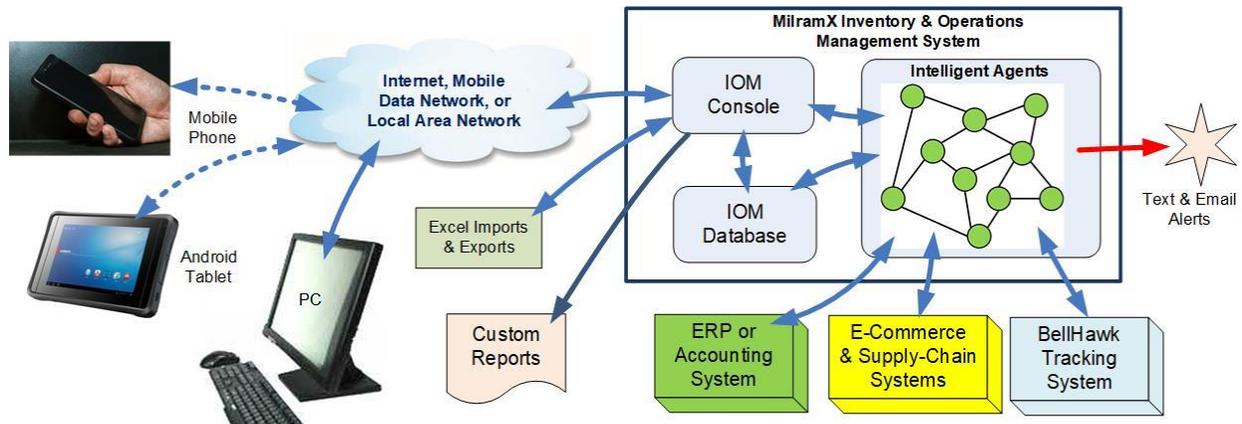
Here the BellHawk system, implemented in the Pilot, is installed in a ruggedized industrial computer so that it can run 24x7 without any risk of Internet or Cloud-computing failure interrupting operations.

At this stage, KnarrTek's staff works with the client's IT support organization for each plant to deploy BellHawk in a box at each site and possibly link each site to a centralized MilramX based system running in their private "Cloud".

3. KnarrTek can assist the client's IT staff install BellHawk on a dedicated Windows Server in their own data center. Note that a dedicated server and not a shared server is required to run BellHawk for performance reasons. Also, the BellHawk label printing software will be required to be installed on a Windows Workstation, in each plant or warehouse, for high-speed label printing on barcode label printers.
4. Clients can choose to abandon the implementation of a barcode tracking system after trying out BellHawk in the Pilot phase. Here, all the client has invested is the time of its people and the cost of the time of the KnarrTek staff in helping the client's staff learn practically about the pros and cons of barcode tracking. This is typically much less expensive and far more effective than sending managers and staff off to a training course.

Sometimes smaller organizations find that they are not yet ready, despite the benefits, to adopt the complexities of barcode data collection, nor the operational constraints and control that comes with it. Such organizations are better off with using paper forms and manual data entry until they have grown to the point where they need the operational control that a system like BellHawk can bring (often when they need two layers of management). But, when they are ready, they will already have the institutional knowledge about what to do.

## Implementing Operations Management and Decision Support Systems



These MilramX based systems are often implemented with one or more BellHawk tracking systems but can be used without BellHawk, where appropriate.

The first step in the implementation of such a system is for KnarrTek staff members to work with the client to determine the management goals for the system and the functions it will perform. It is important to recognize, however, that this system is for guidance only and that the details may change over time, as system's implementation proceeds incrementally.

Based on this document, the overall project is divided into implementation phases, with each phase having a specific operational goal.

Within each phase there may be a number of activities:

1. Detailed design of interfaces, screens, reports, and DTOs.
2. Implementing interfaces to one or more systems, including custom Excel imports. This may be done by an external system reading and writing data exchange tables within MilramX database structure or by using intelligent agent DTOs (Data Transfer Objects).
3. Writing intelligent agent DTOs within MilramX to exchange data between interfaces so as to automatically move information from one system to another.
4. Writing DTOs to examine data within the MilramX database and send Text and Email alerts to managers and their staff, when required.
5. Writing user screen to interact with the Inventory and Operations Management (IOM) database within MilramX.

6. Writing DTOs to exchange data between the IOM database and the data exchange tables for the external systems.
7. Creating custom reports and Excel exports based on data captured by MilramX

After the detailed design task of each phase, KnarrTek will prepare an estimated schedule and budget for the implementation of the phase, which will need to be approved by the client before implementation proceeds.

It is important to recognize that, rather than write a detailed specification for the overall system, or even for each phase, an agile development method is used where the client tests the software as implementation proceeds and makes adjustments to their requirements as the deployment proceeds.

It is also important to recognize that with this evolutionary approach it can take many months or even several years to fully deploy a system that meets a broad swath of organizational requirements. Clients are expected to pay incrementally for the services they need from the KnarrTek team as well as to pay rental fees for the software licenses for those features of MilramX they are using operationally.

Coding of DTOs, Interfaces, and User Screens is done using the Microsoft Visual Studio .Net Development Environment. While over 90% of the needed code for typical applications is provided by the MilramX framework, there is still a significant amount of software development needed. This software development is typically provided by KnarrTek's technical staff.

Alternately, for the IT departments of large clients and systems integration organizations, with appropriate programming skills, that wish to do their own software development, the MilramX software platform is also available as a .Net software development kit (SDK). For such development, KnarrTek can train the client's programmers in the use of the MilramX SDK, provide systems design expertise, and assist the client's software development team as issues arise with the use of MilramX.

## **Commentary**

We recognize that KnarrTek's role is to enable its clients to implement technology solutions to their operations management problems. Properly implemented, these systems can have a very high return on investment both in terms of labor savings and improvements in organizational efficiency.

This is far more than simply providing the needed software, equipment, services, and supplies but rather KnarrTek is committed to implementing whole solutions that truly meets each client's needs. As such, KnarrTek's approach is to work as a team with each client's managers and staff in implementing these systems and then to provide the ongoing support needed by clients for many years to come.