

Hexner Limited

# Animal Tracker Facility Management Program

Conceptual Description

Hexner Limited  
27 St Peters Road  
Holsworthy  
Devon EX22 6FB  
UK  
<http://www.hexner.co.uk>

# Introduction

Experiments performed on laboratory animals are one of the methods of obtaining modern scientific knowledge. Laboratory animals are used to validate hypotheses, to perform tests of new drugs, and are also a source of experimental material.

Numerous experiments, especially gene manipulations, need several generations of laboratory animals for gaining the aimed result. Such experiments need complete documentation, which is available not only for scientists, but also for personnel working in the animal facility. Part of this information is demanded by state authorities for the control of ethical and effective utilisation of laboratory animals.

## **R**easons for using information systems

1. Reasons for applying the computerised information systems in the animal colonies (see Fig. 1) are:

- a) The marking of single entities (cages or individual animals)
- b) The maintenance of data (information concerning cages or individual animals).

2. Animal Tracker, a management program, was developed to meet this need:

a) User's requirements are compared with the existing program structure to achieve a customised application program, which results in:

- a. more efficient information flow
- b. improved accessibility of the information
- c. decreased number of maintenance errors
- e. management cost reduction

b) Animal Tracker advantages :

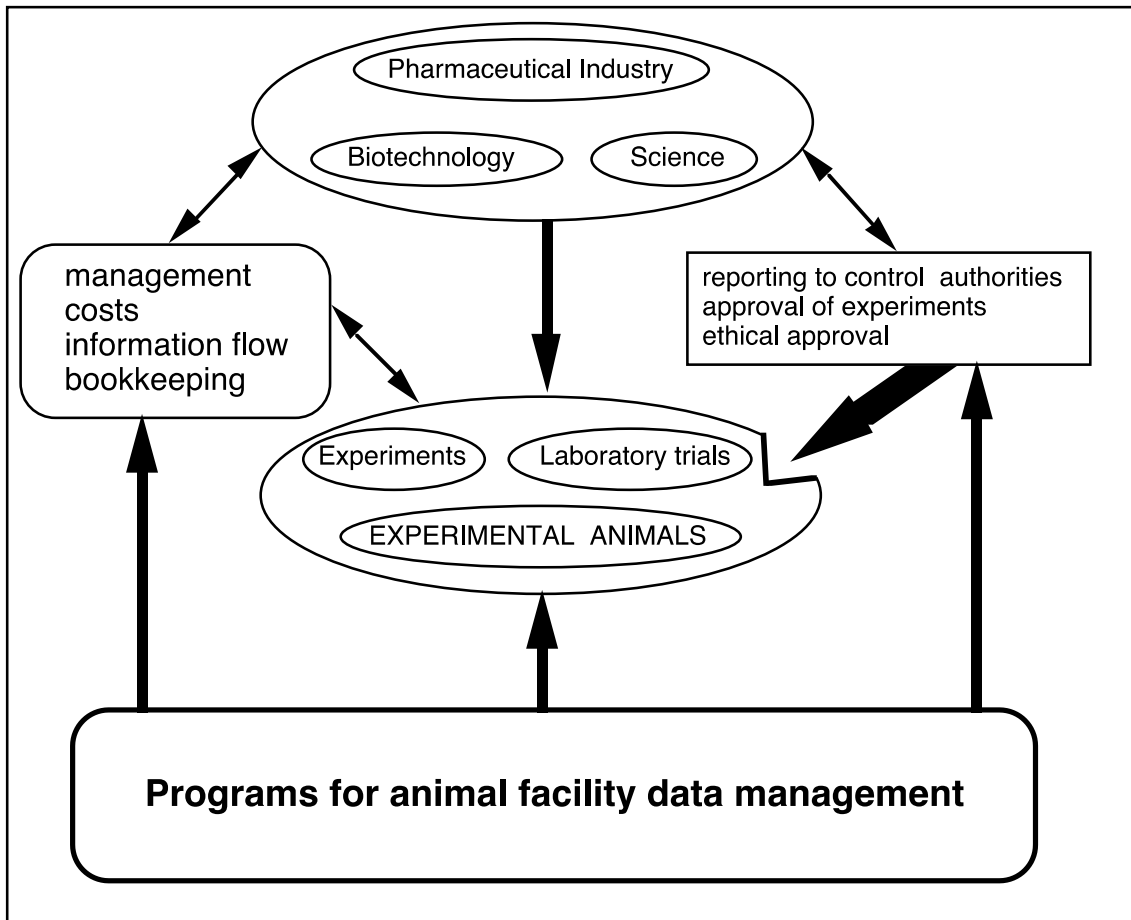
1) facility personnel

- a. simplified data entry
- b. increased speed of tracking
- c. greater experiment reference
- d. decreased number of errors

2) facility managers

- a. concise reports aid in auditing
- b. immediate document generation upon request

- c. tracing of employee errors is improved
- d. cost reduction due to efficiency increase
  
- 3) external agencies (including control authorities)
  - a. due to concise, organised, "on hand" information
  
- 4) scientists
  - a. due to concise, organised, "on hand" information



*Fig. 1. Information system for animal facility and its relationships with other subjects*

## Animal facility and computer infrastructure

An installed computer network improves the accessibility of the information maintained by animal unit administrator. Fig. 2 shows the information flow between:

1. Animal Units
2. Administration of the animal facility
3. Researchers and laboratory staff

Fig. 2 summarises the main questions addressed to the animal unit administrator. These issues and many others are solved by using the program Animal Tracker.

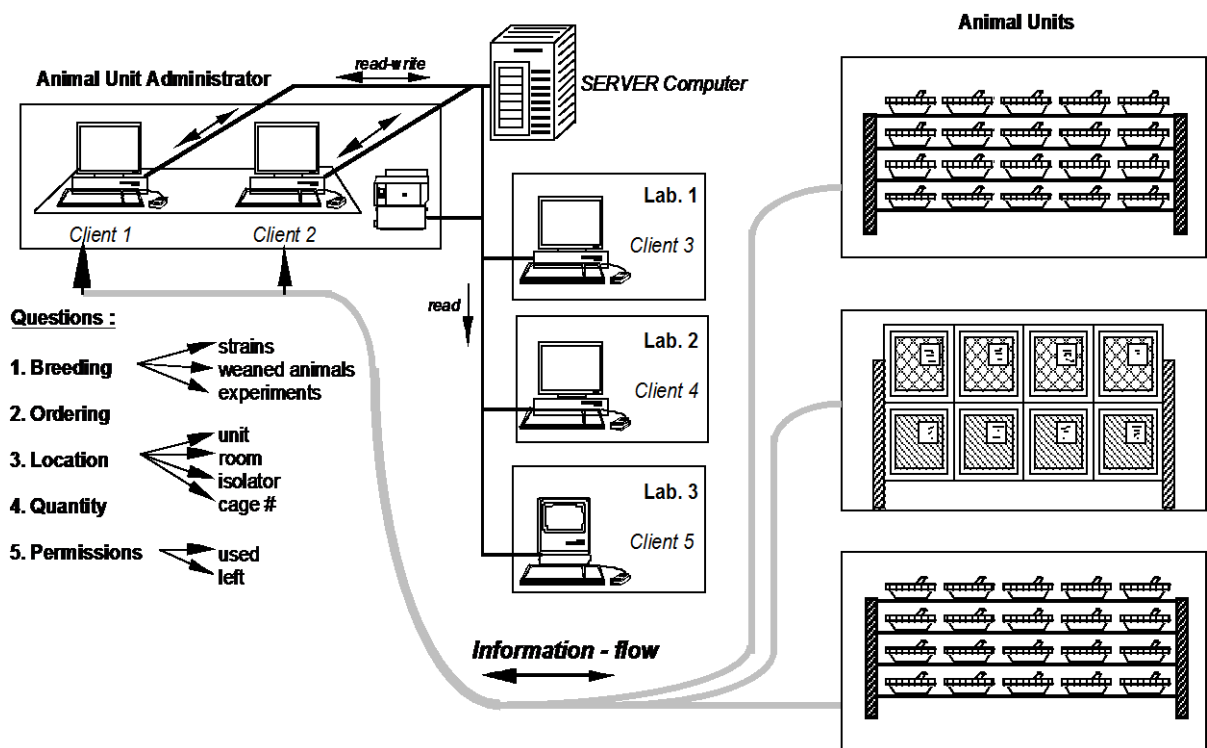


Fig. 2. Structure survey between information system infrastructure and animal units

The details, of how the information flows are established in a particular animal facility, is dependent on the facility's conditions. Customisation of the Animal Tracker program allows for modifications of its structure to the client's need without changing the system of the work flow in the animal unit.

# Animal Tracker

Animal Tracker is a program for data management of animal facilities. Animal Tracker has been designed with two aims:

- to prepare an efficient management tool for animal facilities
- to allow customisation of limited parts of the program to accommodate specific user requirements

The customisable modules allow you to prepare an installation of the program very quickly. Such an approach enables us to meet specific needs of every user.

Animal Tracker contains several independent modules, which can be purchased separately. The user of the program can select the modules with requested functionality.

Animal Tracker is fully multi-user. The program uses Client-Server architecture using the Microsoft development environments (MS Access as a front-end, MS SQL Server, MS FoxPro for some reporting functions). Client-Server architecture using ODBC (Open Database Connectivity) allows use of this software on multiple server and networking platforms.

Animal Tracker covers all basic data management activities performed by the animal care staff. These include: *Animal Orders* , *Animal Requests*, *Storage of Animals*, *Projects*, *Protocols* , *Task Scheduler and Measurement Module*.

Animal Orders is a software module which includes all essential operations of animal ordering. The orders may begin from investigator requests (see Remote Requests) or by entering the order manually. The number of ordered animals could be compared against to the count of animals permitted for a specific experiment.

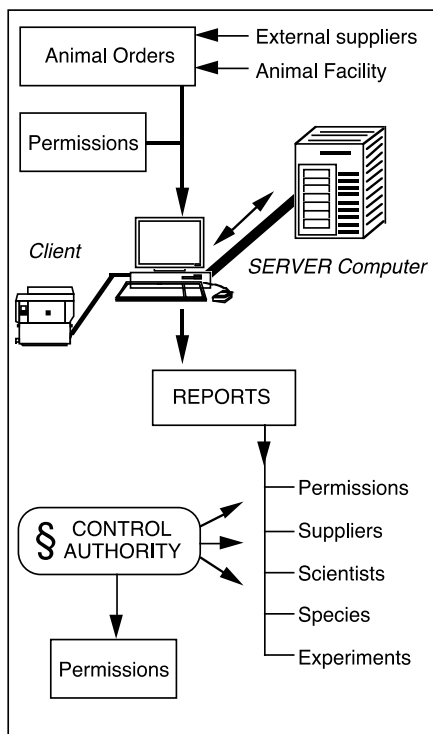


Fig. 3. Animal Orders processing

The shipment of ordered animals is recorded. The multiple deliveries of one submitted order are also available in this System. The investigator is acknowledged that the ordered animals are available on the stock.

The animal ID are assigned to the animals in the delivery recording process. The data about each animal is written into the database.

Optionally, an account for each investigator can be maintained for animal orders.

Animal Orders gives a detailed overview of animal usage. Multiple reports with total calculations are supported (e.g. experimental permissions accounting, suppliers accounting, species accounting etc.).

Custom definition of the reports is available and any combination of the data can be printed.

The query based data could be exported to MS Word or MS Excel, this allows further processing of the data according to the user's wishes without assistance of the developers.

All frequently used functions are available through intuitive interface using toolbars and on screen buttons.

**Featuring briefly:**

- Enter the order
- Assemble an order from requests
- Print an order
- Submit order to supplier
- Check the number of permissions
- Record the multiple deliveries
- Fill investigators requests
- Acknowledge investigator
- Calculate billing of orders to investigators account
- Capture animal usage data
- Print reports for authorities
- Print reports of used species strains, experiments
- Define custom reports
- Export data to Word, Excel
- Electronic mail option
- Maintain catalogue of available strains and species
- Produce Animal ID
- Intuitive interface
- On-screen buttons for most frequently used functions
- Manage delivery groups of animals
- Remote ordering option (WWW)

Animal Orders can be handled through Animal Requests. The investigator fills requests

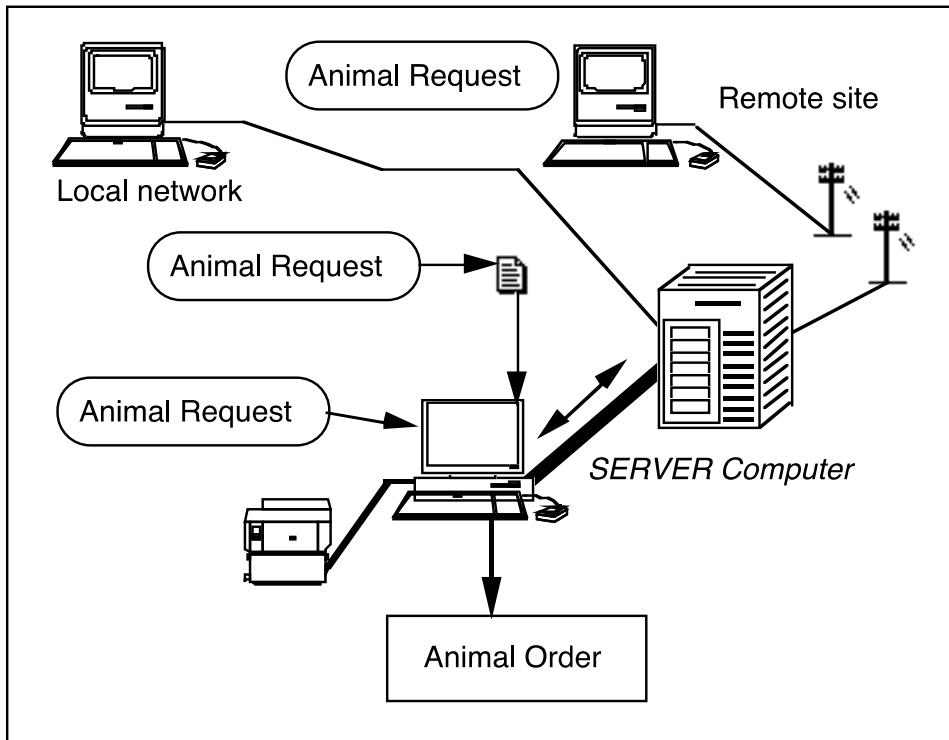


Fig. 4. *Animal Requests processing*

either in electronic form, or on the sheet. The manager assembles the order from the requests by using program function. Using Animal Requests will make the ordering process simple and will prevent multiple purchase orders to one supplier. The animal orders can be assembled from requests at any time.

The request usage is not mandatory. The choice of using requests is decided by each client.

Animal Requests allows easy communication between manager and investigators. The investigator will be notified of the animal delivery.

The animal requests are automatically satisfied by the delivery data entered into the database. The priority of filling requests could be managed.

Reporting features of the Animal Requests module are similar to those in the Animal Orders.

**Featuring briefly:**

- Enter the request
- Assemble order from request
- Print request
- Electronic mail option
- Report on outstanding request
- Reports per projects

## Storage of Animals

The Storage of Animals maintains the actual census of the animals.

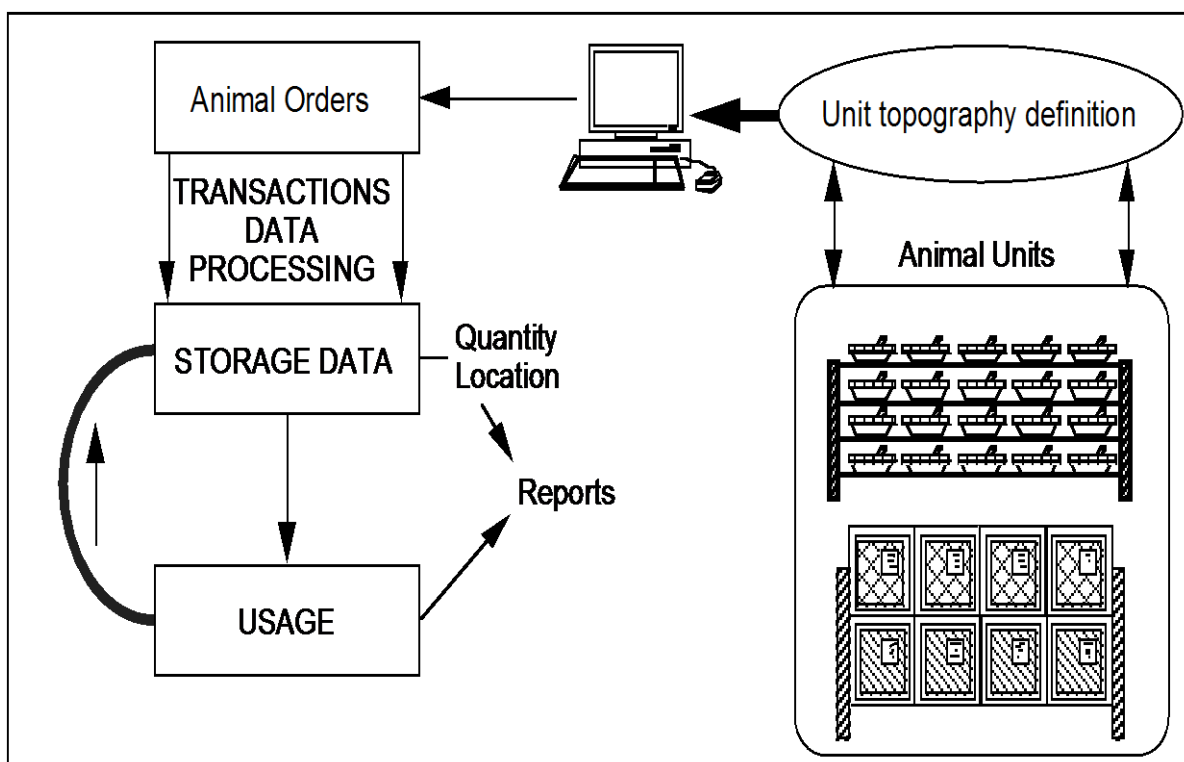


Fig. 5. Storage data

The storage module captures data about basic operations in animal units - moving the animals from place to place, dispatch of the animal, printing reports.

The shipment of the animals is recorded and empty storage data is created. The empty space for a new cage could be found in the animal units. The cage cards are printed. The items listed on the cage card could be selected by the user from the list. Depending on clients needs, the proper printer (e.g. Label Writer) will be selected. The use of self-adhesive stickers, printed on common printers, is also possible.

A census of the animals is maintained, when animals are shipped from the units. Delivery bills of shipped animals to investigators can be printed.

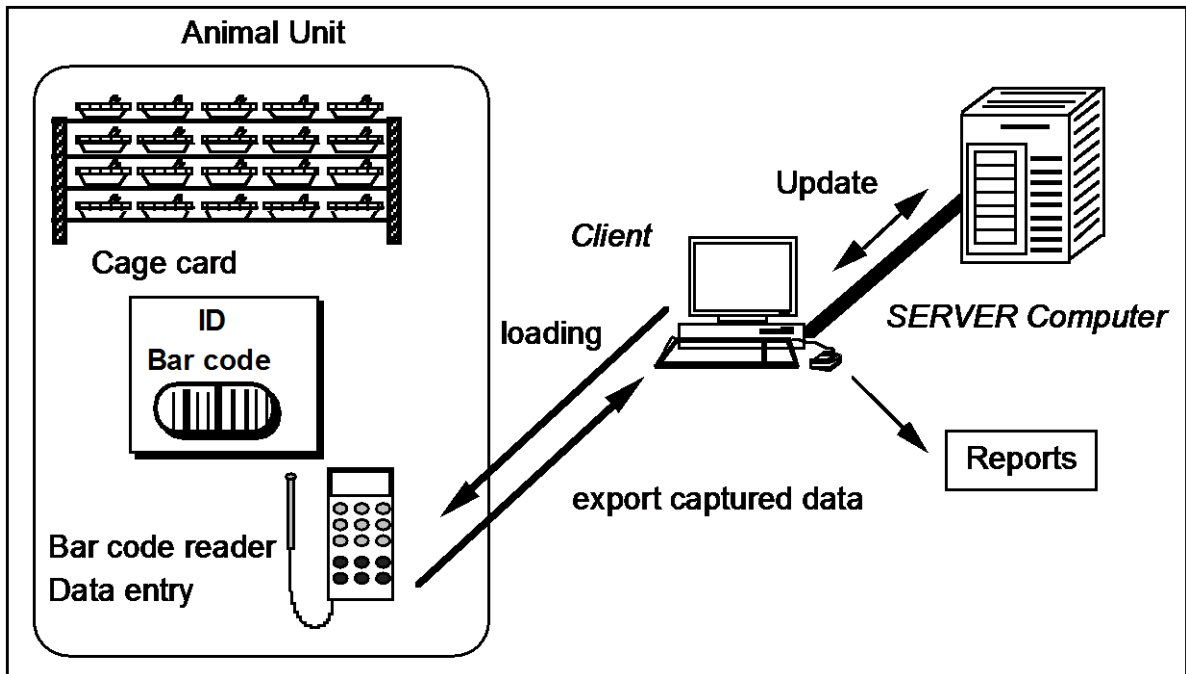
Reports for investigators about their animals stored in the units can be printed on a periodical basis. These reports cover the information about the number of stored animals, their location and age. Reports can be customised according to client needs.

A billing mechanism for storage costs can be implemented on client's demand. The care day costs of one animal or care day cost for one cage can be billed to the investigator.

An On-line access to the selected storage data could be established for investigators. This option significantly helps in locating the animals, in the units at any time. Animal Manager can prepare the requested animals to a temporary storage place and can notify investigator with e-mail message.

**Featuring briefly:**

- Create storage data by animal shipment automatically
- Place animals in the units
- Define the cage card
- Print the cage card
- Maintain animal census
- Print moving report
- Define topography of the units and shelves in the units
- Review empty space in the units
- Track rooms and cages
- Track transfer of the animals
- Print reports for investigators
- Define custom reports
- Print reports for animal care personnel
- Intuitive interface
- Manage costs
- Define billing unit
- On-line access
- E-mail option for acknowledgement



*Fig. 6. Bar code readers and data processing*

---

## Projects

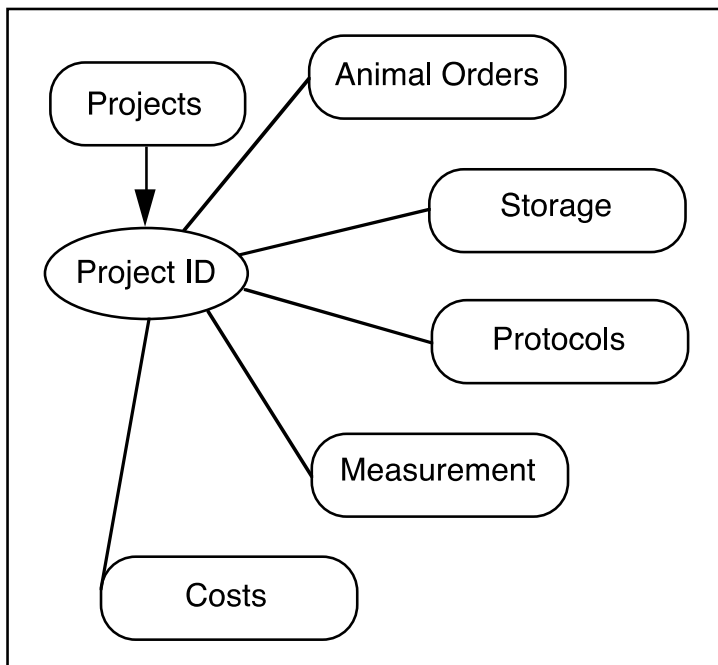
Projects allow the user to define project description. The project ID is used throughout the entire system, this makes it possible to track all tasks, events, animals, and costs related to an exact project.

The information recorded in Projects can be defined according to the customer's needs. A text file from MS Word program can be recorded as a project description using the technology OLE.

OLE (Object Linking and Embedding) technology allows one to keep the files created in other applications which support OLE standard recorded in the database. This approach is guaranteed of having the last modified version of any documents accessible to the relevant users. The document can be edited and modified as any other file created by OLE-supporting application.

OLE standard allows a quick implementation of requested features in the system.

OLE standard and the data objects containing the files created by other applications are secured against non-permitted access. The user's rights (e.g. view document, edit document) can be assigned by the system administrator.



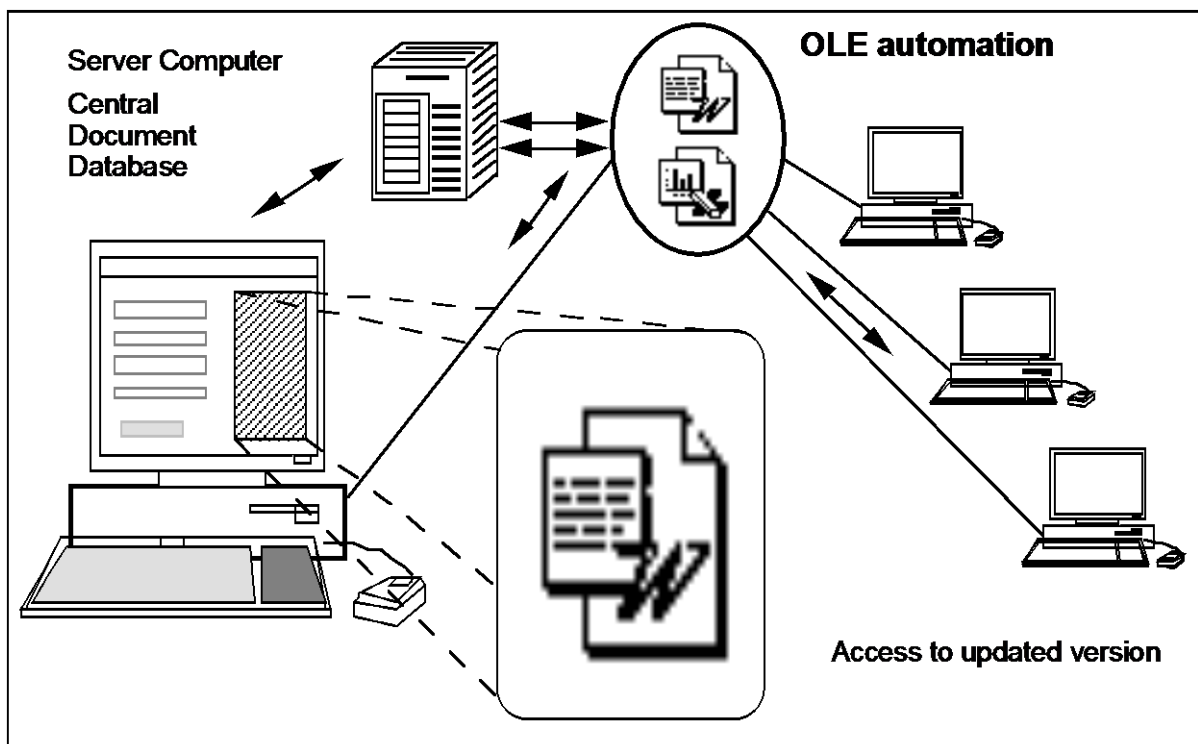
*Fig. 7. Manage all information through Project ID*

### Featuring briefly:

- Define project description
- Create project documentation
- Review project documentation
- OLE technology support
- Import of external file as description
- Define project records
- Review protocols
- Report protocols
- Report ordering
- Report measurement
- Review project costs
- Report on related animals

Protocols allows the user recording of data requested by control authorities to be recorded about experiments. The protocol record can be automatically created when the animal order is accepted. The possibility to create multiple protocol records belonging to one order is fully implemented.

The format of the protocol can be modified. The OLE technology allows transfer of data from other applications into the database. Thus the protocols can contain the complete information about the particular experiment.



*Fig. 8. OLE-technology allows the user to use any application as a data source for database*

**Featuring briefly:**

- Define protocol description
- Automatically create protocol record
- Review protocol documentation
- OLE technology support
- Import of external file as description
- Define protocol record format
- Review protocols
- Report protocols

Task Scheduler allows the user to define and manage staff event scheduling.

The System allows the user to define any event in the *event definition subsystem*. Every event is linked to pre-defined event type. The number of pre-defined event types is unlimited.

The pre-defined event types are tools for wide customisation of the program. The specific reports are designed for specific event types. The reports covers the scheduled task for a specific unit, person, or animal group.

The event record contains information about event type, person, date, time, and target group of animals to which the event is applied. The target group of animals is defined in the *group definition subsystem*. Any number of animals can be defined as a group. The System allows the user to describe wide range of activities in the facility in the groups. The groups prevent the repetitive entry of the same data in the system. The repeating task on the group animals are described very efficiently.

The group system produces an *event journal*. The function of the event journal is recording every single event on the animals. The group definition is a way how to produce the records in the event journal automatically.

The event journal has items to describe detailed information about each single event related to specific animal. Thus, the track of all events occurred with animals is established. The events can be retrieved from the event journal using the different keys (e.g. animal ID, personnel ID, time etc.). The result of data retrieval can be exported to other applications (e.g. MS Excel).

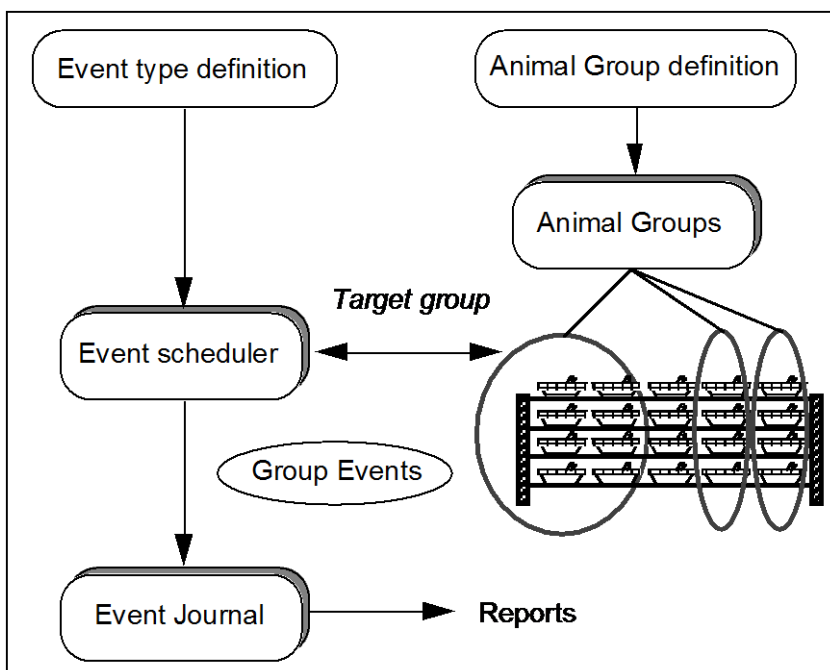


Fig. 9 . Event records concept

**Featuring briefly:**

## Animal Tracker

---

- Pre-defined event types
- Define event type
- Reports on event types
- Manage events
- Produce to-do list for staff
- Define animal groups
- Define group description
- Produce event journal
- Event history for each animal
- Custom views of event history
- Report events for animal ID
- Manage group events
- Report events for groups
- Animal group relationship report
- Export data to MS Excel

## Measurement

The Measurement module allows the user to capture miscellaneous data related to an animal's event history. The structure of the data and their display format can be defined. The source of the data can be anything measured on the animals or results of the laboratory assay. The application of drugs, cell injection and antibodies can be also captured in the measurement module.

The data structure is created as an animal group for measurement. The animal group contains additional information about the structure of the measurement data. Thus the animals are selected for measurement operations.

The sheets for collecting the data are printed. Facility staff performs the required actions and writes the results on the sheets. Finally, the data captured are entered into the database.

The measurement module is the extension of *Task Scheduler*. There are several basic views of the data implemented. The additional design of the data views is done in the customisation process. The query tool for easier data retrieval is supported.

The captured data could be exported to MS Excel for further processing. The technology OLE is supported in the system. Thus, the measurement value can be OLE-object like an Excel sheet. The data can be entered using other application and stored in the database. The user can define the measurement sheets (e.g. in MS Excel) with all needed formulas and data processing without developer assistance.

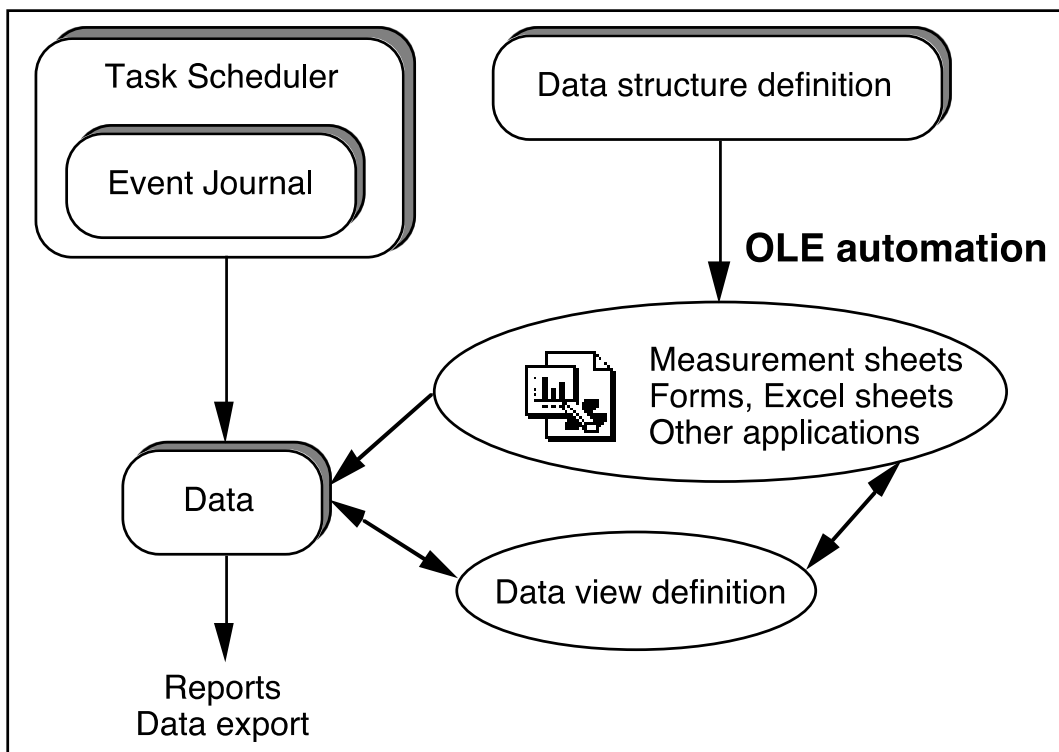


Fig. 10. Measure data capturing concept

## Animal Tracker

---

### Featuring briefly:

- Define data structure
- Define measurement group
- Create measurement sheets
- Print to-do lists for staff
- Print measurement sheets
- Enter data
- Modify measurement data
- Define data views
- Produce event history
- Support OLE-technology
- External application as data sheet
- Report measurement
- Capture animal data
- Capture laboratory assays results
- Export data to MS Excel

Animal Tracker is trademark of Hexner Limited

Microsoft, Windows, Windows NT, MS Access, MS SQL Server are registered trademarks of Microsoft Corporation.

## Technical specifications

Animal Tracker uses Client-Server architecture with graphic user interface front-end.

Following products and tools have been used to develop Animal Tracker:

- Microsoft SQL Server
- Microsoft Access

### System requirements

#### **Client**

- Standard PC configuration
- Operating system Windows XP or newer

#### **Server (for Microsoft SQL Server software)**

- Microsoft SQL Server 2000 or newer

#### **Other server software options**

The possibility of using different server software such as Microsoft SQL Server exists. The ODBC (Open Database Connectivity) interface is supported by many server software vendors. Thus the specific server software selected by client can be used. Such an approach allows you to save costs on server software and server administration training costs. However, the details of a concrete solution (server software, network protocols) are subject to discussion.