

HEALTHCARE SOLUTIONS OF DIGITAL WORLD

R&D AND INNOVATION CENTER



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AKGÜN  
YAZILIM

**AKGUN**  
Hospital Information  
Management Systems (HIMS)



**Uninterrupted Service with Our End-to-End Solutions**

**AKGUN HIMS is a Healthcare Information Management System Platform** designed for healthcare service providers to offer their services with the best, most efficient and integrated IT infrastructure.

It has been developed for enabling institutions to undertake their financial and administrative works regularly and in a controlled manner, to track revenues and expenditures and to manage resources correct and efficiently. Its most substantial objective is to provide healthcare institution directors with strategic decision support.

It can meet the evolving and dynamic needs of healthcare sector and support a wide range of infrastructure alternatives thanks to its modern system architecture and easy manageability, parametricity, flexibility and interoperability.

AKGUN HIMS can operate independently from the operating system both on the client and server side. It can operate on all relational database and application servers built in compliance with industry standards.

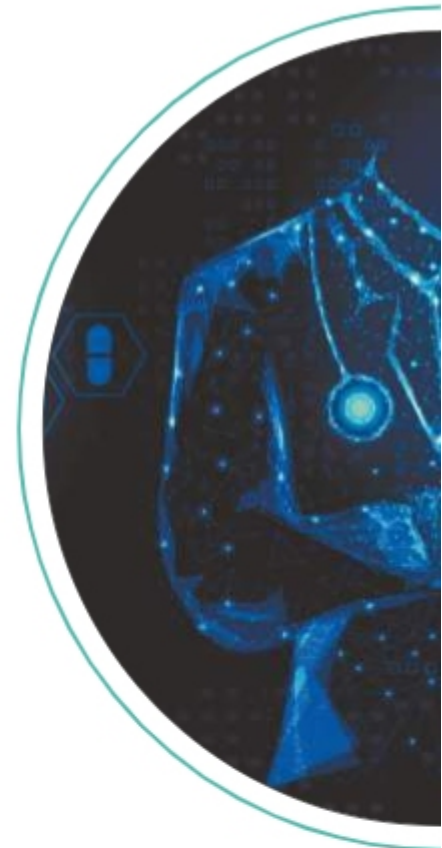


## Technical features include:

- ◆ Browser Independent,
- ◆ Multiple language support,
- ◆ Multiple currency support,
- ◆ User-friendly user graphic interface,
- ◆ Parametric, flexible and easily customized structure,
- ◆ Multi-layered architecture support,
- ◆ Client operating system independency,
- ◆ Operability in client without installing additional applications,
- ◆ Support for all standard operating systems (Windows, Linux, etc.),
- ◆ Compatibility with Mobile Applications (Tablet PC, i-Pad, Smart Mobile Phone, etc.),
- ◆ Server support for all standard applications,
- ◆ Optional independency from database management system,
- ◆ RTL (Right to Left Language) support,
- ◆ Full compatibility with office software (Microsoft Office, Star Office, Open Office, etc) (Microsoft Office, Star Office, Open Office, etc.),
- ◆ Role-based authorization.

AKGUN HIMS boasts an infrastructure that supports internationally recognized healthcare standards (ICD-10, ATC, LOINC, CPT vb.) in medicine and offers communication to the international HL7 standards.

It allows healthcare directors to enable their organization to record, monitor and assess information on all financial and medical processes of a patient starting from admittance to discharging in an integrated manner. It offers a scalable application platform that can respond to a wide array of choices including a single hospital, group hospitals or regional solutions. While group hospitals can be managed with an integrated central system, each structure (hospital) within the organization can receive service as a unit by its own. Interhospital data sharing, information access and resource use are enabled in framework of the rules to be set forth by the central management. Therefore, the hospitals of the entire organization can be managed through a single service culture and understanding.





## Compliance with National Healthcare Strategy:

AKGUN HIMS fully complies with the legislation published by the Health Authorities. Furthermore, issued legislative changes are followed and complied in a timely manner.

## Management of Central Health Facilities

The system provides the information infrastructure required for hospitals to monitor, evaluate and oversee the activities. It offers the features and benefits given below with its multiple hospital structure.

- ◆ While multiple hospitals / healthcare centers can be managed in an integrated structure through a single application, each hospital affiliated to the association can access its own data and grant other hospitals access to its resources in framework of the rules set forth by management.
- ◆ The application can serve to all hospitals from a single information center, savings are yielded in the costs of technologic infrastructure, data security, product licensing, maintenance and support services and expert team.
- ◆ AKGUN HIMS allows creating detailed electronic medical records of patients independently from one hospital. Therefore whenever a patient refers to any hospital, all information about the patient including medical history, allergies, vaccination cards, regularly used medicine, diseases, conditions and relevant treatment plans, hospital reports etc. can be accessed by the relevant physician.

## Integration and Information Sharing with National Portals and Medical Systems

AKGUN HIMS provides the required integrations as required by the relevant national and international regulations. AKGUN HIMS provides the integrations required by Ministry of Health and Social Security Institution pursuant to the legislation Integration with Ministry of Health web services.



## AKGUN HIMS;

- ◆ ICU Intensive Care Information System,
- ◆ PACS–Picture Archiving and Communication System,
- ◆ Smart Tele-Radiology Systems,
- ◆ Electronic Management and Archiving Systems,
- ◆ Laboratory Devices Integration,
- ◆ Family Medicine Laboratory Integration,
- ◆ Decision Support Systems,
- ◆ Personnel Attendance Tracking Systems,
- ◆ Procurement Management System,
- ◆ 112 Emergency Automation System,
- ◆ Drug Database Integration,
- ◆ Barcode Systems,
- ◆ Patient Biometric and Authentication Systems,
- ◆ KIOSK Integration and etc.

provides various integration opportunities with other applications of the health organization.

The design of AKGUN HIMS aims for ergonomicity and ease of use in response to the requests from end users. The application screens designed from the perspective of end users aim for carrying out daily procedures in the fastest manner with the minimum number of clicking.

AKGUN HIMS is fully compliant with HIMSS Stage 6 and Stage 7 requirements.





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**AKGUN**  
Laboratory Information  
Management System (LIS)



**Control Your Pre-Analytic, Analytic and  
Post-Analytic Processes**



## AKGUN Laboratory Information Management System

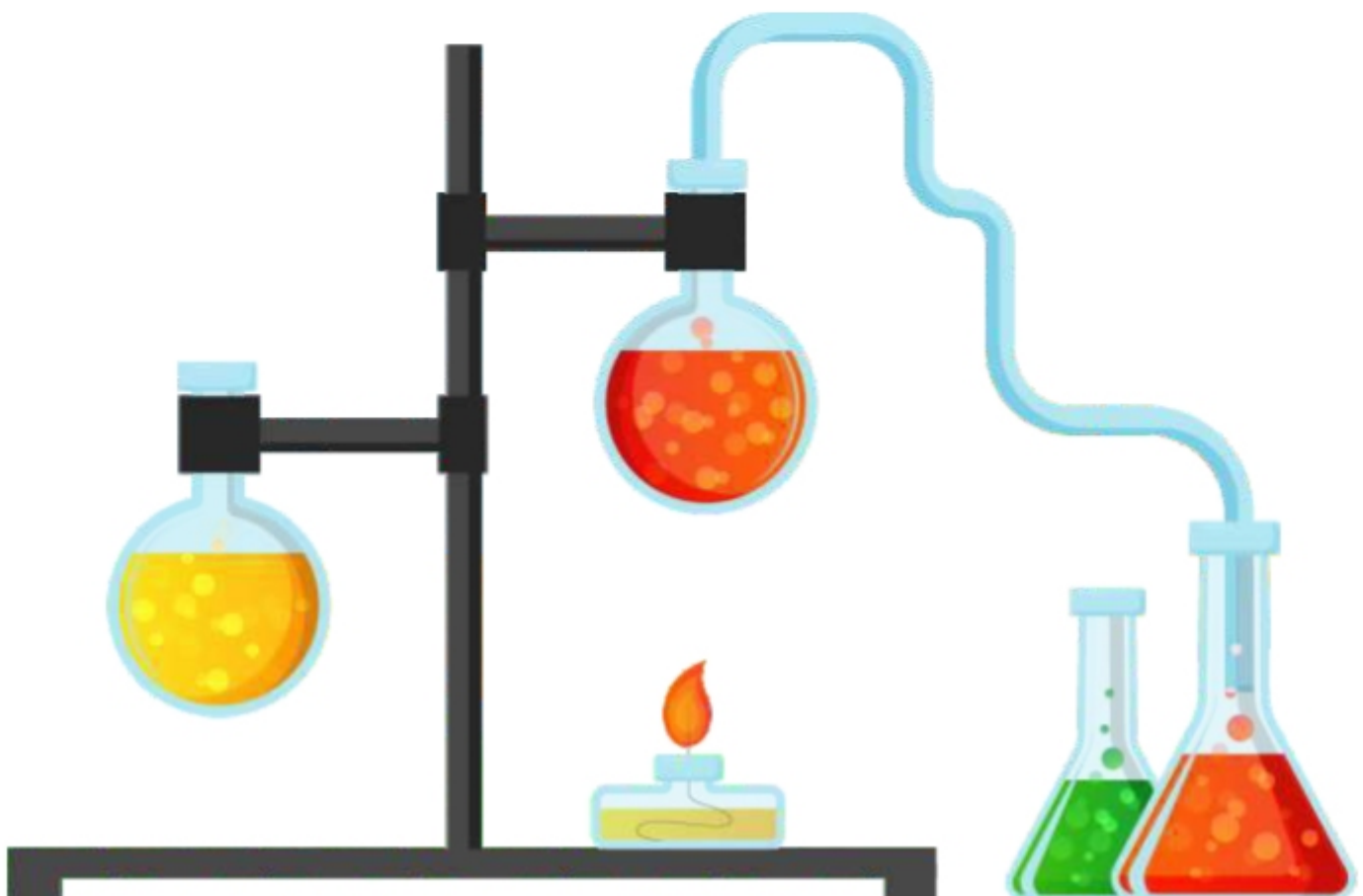
AKGUN LIS is a web project produced to work stand alone and can be used, purchased on its own.

## AKGUN Laboratory Information Management System;

- ◆ Monitors tests requested by the physician,
- ◆ Monitors, sample acceptance and delivery according to the operational order of the laboratory,
- ◆ Interactive graphs allow comparison between the patient's old and new results, Records input-output times of centrifuge devices,
- ◆ Enables sample aliquoting,
- ◆ Sample archiving
- ◆ Informing patients to give samples via LCD call screens Records the results of tests conducted by all clinical laboratories, including Biochemistry, Microbiology, Molecular diagnosis,
- ◆ Provides easy integration with wide spectrum plug in device integrations,
- ◆ Technician, expert and automatic approval mechanisms to facilitate the work process,

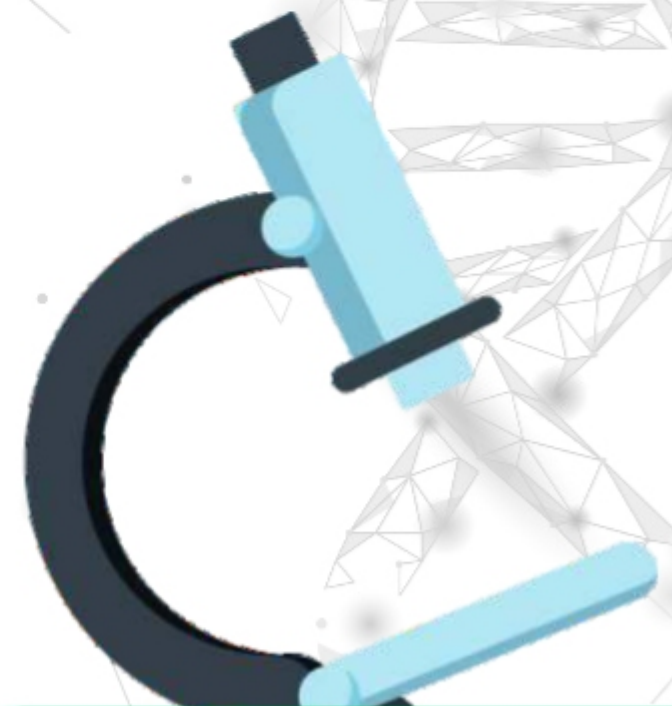


- ◆ Fully compliant with the rational laboratory directive,
- ◆ Pre-analytical, analytical and post-analytical processes within the LHSS (Laboratory Errors Classification System) can provide logging and statistics,
- ◆ Fully developed with literature research and field experience, capable of measuring the reliability of laboratory results with quality control and calibration screens,
- ◆ Reporting with total error and uncertainty formulas, giving early warning and measuring internal and external quality of the laboratory with international rating systems,
- ◆ This is an information system that can run interactively with the Stock Tracking and Billing Module while performing those stages.



Besides its use in full-fledged health care institutions, Ak LABIS (as LAB. Information System) can also be used in private laboratories. Ak LABIS is a sophisticated system in which the laboratory tests of the patients are followed and finalized from the request stage to the conclusion stage. The product is designed in a way to offer ease of use by laboratory specialists and technicians as well as personnel working at various levels of health care or private institutions.

The systems allows for producing various statistics, text and graphic-based results. Thanks to the graphics, the former and the recent results of the patient can be compared with each other.

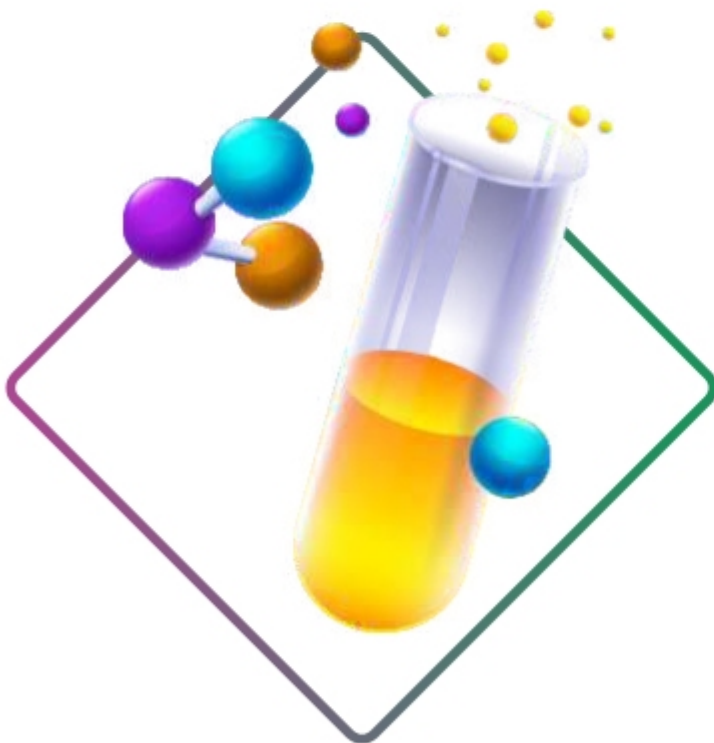


## Advantages

- ◆ Releases you from unnecessary effort and increases your efficiency,
- ◆ The system operates in integrity and accelerates your work flow,
- ◆ The system prevents leakage and increases your profitability,
- ◆ Provides full integration with laboratory devices, eliminates manual test input for the devices and prevents loss of time,
- ◆ Provides a detailed monitoring of the work and increases operation Inspection thus improving service quality and patient satisfaction,
- ◆ The system utilized barcoding in all operation process such as for matching patients, samples and device integrations thus eliminating medical errors,
- ◆ The system provides a flexible statistical reporting module for ad and hoc queries and reports,
- ◆ The system enables using the same tube on several devices thus save tubes and help in reducing additional tube costs,



- ◆ Since the system records all sample movements, thus enabling early intervention for better test results (such as specimen hemolysis problem),
- ◆ Enables assigning priorities for test requests such as Urgent, Routine, etc.
- ◆ Provides flexibility for defining reference values ranges for test such as normal and panic values,
- ◆ Unlimited laboratory result archive,
- ◆ The system provides a flexible statistical reporting module for ad hoc reports.
- ◆ Supports multi-language; content can be exported to various files types and can be accessed on the web,
- ◆ The system is prepared to handle user expectation in the local as well as in the international market. It supports multi-language and multi-currency options and reports can be generated in accordance with the user preferences.





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# AKGUN Radiology Information System (RIS)



In Radiology Units, an Integrated System Is  
Suitable for Telemedicine Processes

## AKGUN Radiology Information System (RIS)

Radiology Information System (RIS) has been developed for required operations in Radiology Departments of hospitals/clinics and imaging centers.

AKGUN RIS is a web project which is developed independently from other projects, which runs stand-alone, which can be used and purchased stand-alone.

### In general, the properties of AKGUN RIS are as follows:

- ◆ Appointment schedules are created at the level of radiology devices and appropriate appointments are provided to the patients.
- ◆ The application calculates the radiation /dose ratio based on the test and generates an alarm if this ratio is high.
- ◆ RIS prepares the device worklist at the technician and expert role level.
- ◆ Provides access to images taken on the PACS side.
- ◆ The images examined by the radiologist are reported.
- ◆ The system has a separate reporting system for mammography.
- ◆ Approved radiology reports are delivered to the Ministry through telemedicine integration.
- ◆ Requests are received through telemedicine web services with different hospitals.
- ◆ Requests are received and sent through the web service of the project by different hospitals.
- ◆ Integration with different technologies and systems (HL7, WADO, PACS, DICOM).
- ◆ RIS Decision Support System is a flexible, dynamic and web-based information system that can export data in any format with multiple file and language options.
- ◆ Radiology Inventory Module provides inventory control of consumables used when imaging.
- ◆ Patient information can be accessed via E-nabiz.
- ◆ All radiology processes (patient; examination request, appointment made, imaging started, canceled, finished, report dictated, report written, report approved) are managed with RIS.
- ◆ The system lists the medical notifications about the patients.
- ◆ A survey can be made about the imagings.
- ◆ The system has an automatic SMS function that can send appointment reminders and report confirmation reminders.
- ◆ The patient information screen displays the patient waiting list and invokes a patient alert.
- ◆ Operations that do not require user control can be performed with scheduled jobs. (Telemedicine report submissions etc.)
- ◆ The system has been developed following the international arena. Multi-language and multi-currency options are available.



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**AKGUN PACS  
(PICTURE ARCHIVING  
AND COMMUNICATION  
SYSTEM)**



**Create a Hospital Without  
a Film or Paper, Lower Your Costs...**



## Why AKGUN PACS Solutions?

AKGUN PACS product family is developed using native sources and has a very powerful product support process. User requests are rapidly developed and delivered to our customers. AKGUN offers an affordable range of licensing and support approaches to match with our customer needs. Since the "platform independence" was set as the focal point during the development process of the products, the users are not required to make any changes to their standard working environment.

AKGUN PACS was developed according to international standards in health and is used in lots local and international institutions.

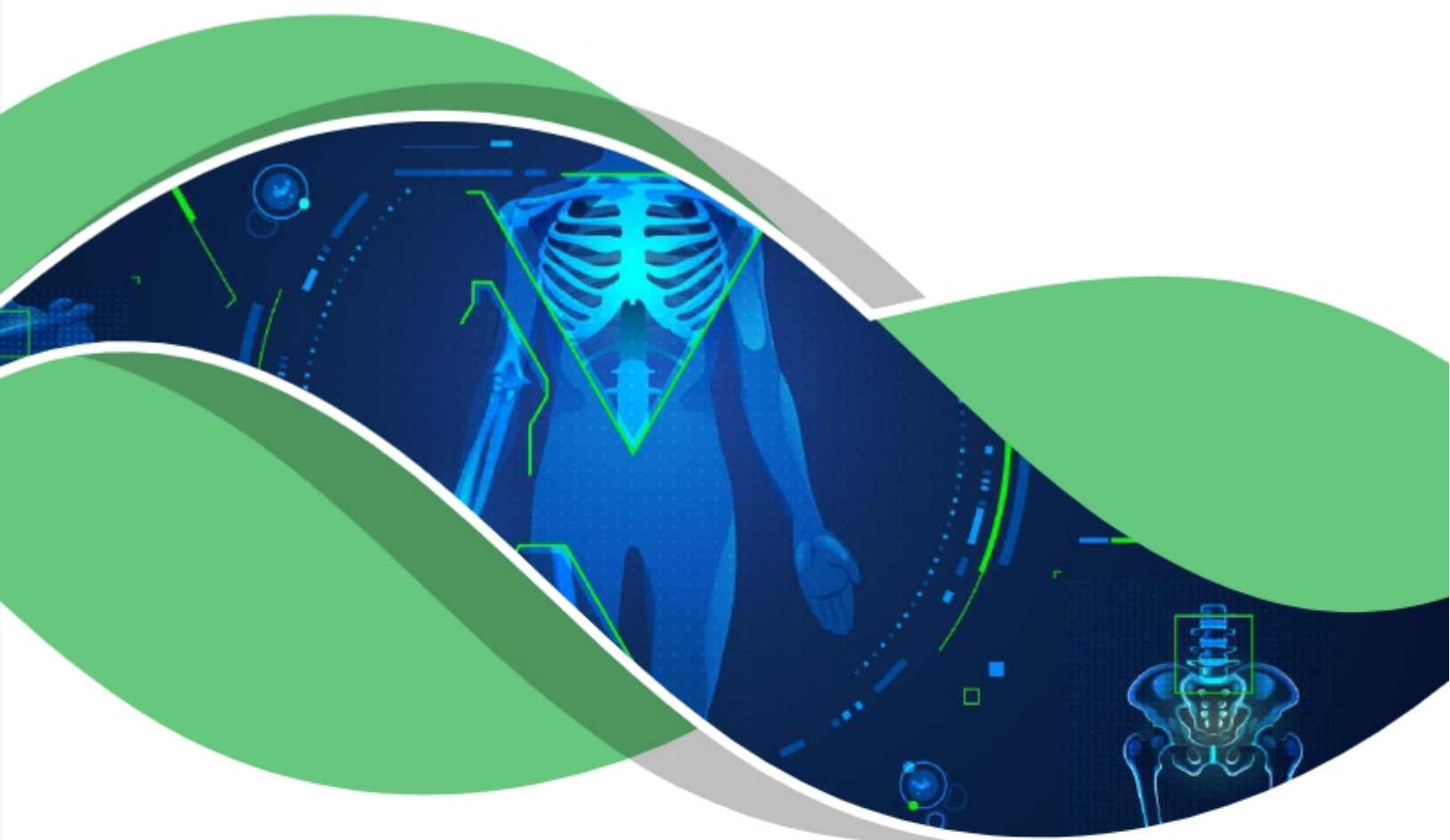
## Special Advantages for You;

- ◆ Archiving, transferring, sharing, displaying and reporting all medical images according to DICOM standard
- ◆ Archiving and sharing images from Non-DICOM devices according to DICOM standards
- ◆ Quality and accuracy in diagnosis assessments
- ◆ Quick Fast access and comparison to past cases
- ◆ Unlimited storage for an indefinite time with digital archiving
- ◆ Tele-radiology, remote imaging and reporting, sharing cases with academic scientific groups
- ◆ Eliminates film bathing procedure thus AKGUN PACS is eco-friendly product

## AKGUN Pacs Server Compress Your Images Lossless...

AKGUN PACS is comprised of the following components to efficiently manage radiology processes at medical organizations

- ◆ AKGUN PACS Server archives images from all digital modalities in DICOM format and serves them to users upon request.
- ◆ It manages archived data.



## **Advantages Provided by AKGUN PACS;**

AKGUN PACS Server sends any DICOM instances which are archived in the server, to any DICOM Workstation using DICOM Query/Retrieve service. In addition, those DICOM instances can also be reached by using AKGUN WADO on the internet or intranet. AKGUN PACS Server works with any 3rd party DICOM Workstation.

AKGUN PACS server provides lossless compression feature where DICOM images before had been stored are compressed to 3 times less to their original size.

AKGUN PACS can automatically direct or communicate received or archived DICOM images to other workstations and PACS according to predefined rules.

AKGUN PACS Server has proved to be operable with different systems at IHE Connectathon organizations. At the Connectathon different vendor PACS products are tested for integration according to workflows defined by Integrating Healthcare Enterprise (IHE). Integration messages are based on DICOM and HL7 standards.

## AKGUN PACS Workstation

### General Specifications:

AKGUN PACS Workstation communicates with every PACS server complying with DICOM and downloads DICOM instances. AKGUN PACS Workstation communicates with any other PACS server in DICOM 3.0 format. It is able to query and download DICOM image files as well as none image files such as Key Image Note, Structured Report, Presentation State and Hanging Protocol.

### Advantages:

- ◆ With proper setup and performance settings large images can be loaded quickly thus allowing radiology specialists to interpret images in a short time.
- ◆ Offers various tools for fast and efficient reporting of images and meets image reading needs. AKGUN PACS Workstation offers fast and efficient reporting and accelerates report operations with its ergonomic, easy to use and customizable interface.
- ◆ It is possible to make measurements including length, angle, density, cobb angle and use many functions including rotate, mirror, negative, zoom and reference line and to access previously written reports and images on the same screen.
- ◆ Images in DICOM format can be exported in many formats including JPEG, PNG and AVI and can be used in similar operations.
- ◆ Detailed images are obtained by excluding unwanted organs and tissues outside the view by applying cut and crop operations on three dimensional images and length, angle and density can be measured.
- ◆ You can obtain MIP, MINIP, MPR and Curved MPR images from these sections. The organ can be viewed with the movement of the mouse on the sagittal, coronal and axial plan and the relation of pathologies with other organs can be measured volumetrically.

## AKGUN PACS DICOM Print

AKGUN PACS Workstation product supports DICOM print as well as WINDOWS printing services. The product provides a user friendly interface enabling to print only the images selected by the user.

## AKGUN PACS CD Burner

The product enables burning case analysis images on CD or DVD when requested by the patient. The product can be easily integrated and operated with frequently used CD-Robot systems in the market.

## AKGUN WADO

### Easily Report Internal or External Images On the Web...

With AKGUN WADO application, DICOM data archived in the PACS server can be accessed in the intranet and over the internet.

AKGUN WADO, with its user friendly and ergonomic interface, allows radiology specialists to analyze patient images and prepare study reports outside the hospital.

## Easy to Use Interface and Image Processing Properties

It is possible to change layout and make measurements including length, angle, density, cobb angle and use many functions including rotate, mirror, negative, zoom and reference line on images from all modalities and to access previously written reports and images on the same screen.





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# AKGUN X-Eye Toraks®



AKGUN X-Eye: Toraks®  
*NidLocater*

**AKGUN**  
**COMPUTER AIDED**  
**DIAGNOSIS SYSTEM**  
**FOR LUNG IMAGES**

The Later The Diagnosis, The Greater The Risk! Ensure Early Detection of Lung Cancer and Save Lives

As a result of long and laborious Research and Development studies, **Computer Aided Diagnosis System in Lung X-Ray Images** have been developed for the first time in Turkey, which improves the quality of healthcare services by enabling the early detection of cancer.

# Computer Aided Diagnosis System in Lung X-Ray Images

The software system determines the areas (target diagnosis or pathology) that are not obvious to radiologists in digital radiology images by using image processing and artificial intelligence methods. CAD is a secondary and assistive diagnostic method while final decision belongs to the radiologist.

## System Benefits

- ⦿ To assist early diagnosis of lung cancer,
- ⦿ To detect anomalies that may be missed by radiologists,
- ⦿ To increase accurate diagnosis rate,
- ⦿ To help early detection of lung cancer from X-ray images,
- ⦿ To speed up the diagnostic process using computer power,
- ⦿ To reduce the workload of radiologists despite the increasing demand.

## System Specifications

- ⦿ **Anomaly Detection**
  - Detection of even the invisible nodules,
  - Interactive marking of the detected nodules as "true"/"false" by the Radiologist,
  - Radiologists can mark additional detected nodules,
  - All marked nodules can be displayed and recorded automatically in the generated reports.
- ⦿ **Reporting and System that Learns**
  - The system continuously learns as more patient x-ray images are reported.
- ⦿ **Flexible Licensing and Different Work Models**
  - Flexible Licensing and Different Work Models based on end user needs.
- ⦿ **PACS System Independency**
  - It can be integrated with any PACS system since it supports the International Standards.
- ⦿ **Support for Education**
  - It can be used as a training tool in Universities, Hospitals etc.



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# AKGUN X-Eye Mammo®



AKGUN X-Eye: Mammo®  
*NüfLocater*

**AKGUN**  
**BREAST CANCER DECISION**  
**SUPPORT SYSTEM**  
**THE AIM**

Approved by the Ministry of Industry and Technology, AKGUN Breast Cancer Decision Support System detects the micro calcifications and masses on mammography images, and assesses the likelihood of benignity / malignancy, which is a first in **Computer Aided Diagnosis** in Turkey!



## AKGUN Breast Cancer Decision Support System

### ○ The Aim

- To detect two major abnormalities, masses and micro calcifications in breast cancer,
- To provide a benign / malign assessment of masses and micro calcifications.

## System Specifications

- Location information of masses and micro calcifications and evaluation of proportionally benign / malignant probabilities,
- Flexible licensing feature (term, perpetual etc.),
- Integration with all PACS brands on the market,
- Besides aiding cancer diagnosis, it can also be used as a training tool.

## Pioneering Strong and Innovative Projects in Health Sector, AKGUN;

Developed **X-Eye Mammo** early detection system for breast cancer that combats against one of the biggest threats to women life. One in eight women diagnosed with breast cancer at a certain time in her life, which ranks second in mortality after lung cancer. While detecting masses and micro calcifications in mammography images, new approaches have been introduced for the benign / malignant evaluation of the related anomaly.

Standing out as one of the best examples of university-industry cooperation and the first national breast cancer decision support system, **AKGUN X-Eye Mammo** presents high accuracy values in the detection of masses and calcinosis as well as in differentiating between benign/malignant abnormalities.

As a result of using diverse methods together unique algorithms have been developed, which made this complicated Breast Cancer Decision Support System viable. The system is a product of long and laborious R & D studies that is assertive in competing with its commercial counterparts.



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# **AKGUN** iVital

## **Intensive Care Unit Automation System**

We have digitalized the intensive care process with AKGUN iVital Intensive Care Automation System.

Because every second spent in intensive care is precious ...

Stores all patient and device data in a single data pool and provides them for the use of healthcare professionals.

## AKGUN iVital Intensive Care Unit Automation System

**Intensive Care Units (ICUs)** are the units where patients with critical condition receive treatment. ICUs have complex processes with high cost and they require expertise. Applications and treatments performed in these units are shaped according to the high volume data coming from related units and systems.

With **AKGUN iVital Health Information Communication Platform**, physiological data produced by various devices in Intensive Care Units can be stored in a single repository, virtualized according to certain criteria, instantly examined by responsible doctors and/or nurses, and based on these vital signs various score calculations can be performed for each patient. Furthermore, it is provided to calculate the vital data trends of the patient with the determined periods on the stored data, and to transmit the early alarms and warnings to the responsible doctors and nurses on the basis of previously defined criteria.

## New Experiences in Treatment Processes with AKGUN iVital

### Digitalization of Intensive Care Processes

- Instant access and monitoring of patient data in Intensive Care Units remotely,
- Grouped data display: monitoring and grouping patient vital signs in areas such as respiratory, circulatory, lung, neurology, EKG, and ventilator,
- Monitoring of patient's laboratory and blood gas results and generating alarms accordingly,
- Display of Infusor and Perfusor data that can be integrated, monitoring data instantly, monitoring of liquid inlets and outlets,
- Ability to perform activities such as; following up the data that comes from the devices connected to the bed of each patient, following up instant graphical data, following up important findings and patient score information with the special dashboard created for each patient,
- Graphical patient tracking methods based on certain researches, data monitoring in various options, ability to display data in graphical or list form, control of reference intervals in graphs, display of different data in different formats, display of the data in pre-determined time intervals and at the desired time,
- Monitoring of ICU patients through a central patient management screen,
- Score calculations such as APACHE II, SAPS II, SOFA: score calculations according to the data coming from the devices, comparison and detailed examination of the calculated scores, ability to carry out studies to obtain maximum results with minimum data,
- The ability to monitor alarms and warnings generated for each patient in Intensive Care Units from a centralized screen,
- Transmitting and managing alarms of patients and defining escalation rules,
- The ability to access data and alarms/warnings of Intensive Care Unit patients from mobile and web environment,
- Sending alarms and warnings of the ICU patients via SMS.

## AKGUN iVital Compliance with International Standards and Integrations

The Health Information Communication platform used for AKGUN iVital complies with international health standards and provides wide and rich integration environment and opportunities. Fully compatible with the interoperability and health information sharing standards HL7 (Health Level 7) and IHE (Integrating Healthcare Enterprise).



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# AKGUN Digital Hospital Solutions



## Digital Revolution in Hospitals What does Digital Hospital mean?

Digital and Paperless Hospital can be defined as a hospital where any medical or non-medical data and images is stored, transmitted and shared as paperless and filmless.



Stop Using Paper in Hospital Services With  
Akgun Digital Hospital Solutions

## Purpose of the digital hospital;

Providing support in providing high-class and healthy service care to patients,

- ◆ Preventing mistakes relating to diagnosis, treatment and drug use,
- ◆ Optimizing and automating business processes,
- ◆ Ensuring optimal use of materials and human resources by hospitals.

Digital Hospital is the future vision of healthcare where advanced technologies are integrated in an efficient, safe and reliable business environment for both patients and healthcare professionals. AKGUN is pioneering the digital hospital transition process with the solutions provided.





## Benefits provided by the Digital Hospital application are as follows:

Decrease in time spent for data entry.

- ◆ Providing rapid access to the patient data.
- ◆ Establishing effective communication between patients and medical staff.
- ◆ Opportunity to view changes in health status of patients in real time.
- ◆ Easy use of the equipment by means of solutions provided.
- ◆ Less mistakes in drug management through RFID and barcode technologies.

AKGUN provides advanced corporate resource planning solution and hardware infrastructures in order to transfer the business processes of hospitals to electronic media, to improve the patient service quality, to optimize the use of resources and to ensure business continuity.

## In this regard, some technologies owned by AKGUN and needed to be included within the scope of Digital Hospital concept:

- ◆ Hospital Information System (HIS)
- ◆ Laboratory Information System (LIS)
- ◆ Picture Archiving and Communication System (PACS)
- ◆ Intensive Care Management System
- ◆ Electronic Document Management System
- ◆ Mobile applications supporting doctor/nurse processes
- ◆ Clinical Decision Support Systems
- ◆ Computer Aided Diagnosis Systems
- ◆ Tele-Medicine
- ◆ Hospital Appointment System (SMS, web, WAP, call center etc.)
- ◆ Bedside monitors
- ◆ Wireless networks
- ◆ Personnel/patient/inventory RFID-based location monitoring applications
- ◆ Mobile applications (Tablet PC, MCA, Smart Phone etc.)
- ◆ Smart building solutions
- ◆ Data center and business continuity systems
- ◆ Network and system monitoring solutions

Concept of big data growing depending on the developments in information and communication technologies plays an important role in healthcare services. The resources and methods needed for the desired improvements in many fields such as protecting and improving health, applying correct diagnosis, identification and treatment, reducing medical mistakes, improving patient safety and increasing the quality of care etc. can be obtained with big data applications.

It is expected that big data will have an important place also in terms of providing possibility to create long-term value in healthcare services.

AKGUN, using advanced technologies in all solution processes, develops a collection of tools, technologies, methods and procedures to process and analyze large amounts of electronic health data.



## By analyzing big data with the decision support solutions produced, AKGUN,

- ◆ Enhances the efficient and high-quality treatments,
- ◆ Proposes alternative therapies to clinicians and patients,
- ◆ Improves diagnosis and treatment selection,
- ◆ Capable of providing real-time information to nurses and doctors to prevent triage, iatrogenic infections, prescription based mistakes and other medical mistakes,
- ◆ Enables remote patient monitoring and proactive care delivery,
- ◆ Provides personalized care by identifying best practices for patients,
- ◆ Provides opportunity for early diagnosis and identification before the progress of the patient's disease symptoms,
- ◆ Develops communication channels between healthcare providers and professionals and even all sector stakeholders.



### IN CONCLUSION;

NO PAPER WILL BE USED.

DOCTOR WILL MONITOR THE PATIENT FROM THE COMPUTER.

PATIENT CONFUSIONS WILL BECOME HISTORY.

DATA ENTRY AND INFORMATION IN PATIENT DATA WILL BE AVAILABLE FROM ANYWHERE AND WHEN REQUIRED.







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