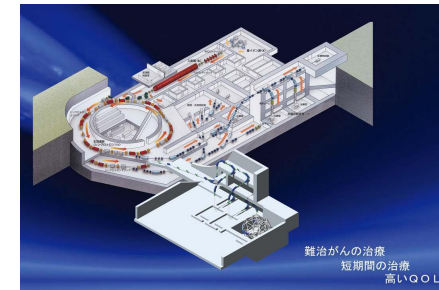# Skill Management

for accelerator operation and maintenance.

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It seems to be different, but there is a lot of common

Such as · · ·
✓ It is assembled with many parts or components.
✓ Many people are cooperate and work together.
✓ Various skills are required.

Objective

- **Introduce our Skill Management Program**

- **Discuss with other operator experience**

Outline

- ## Background
  - Our facility
  - The supporting partner

- ## Introduction
  - What is the SMP, skill management program,.
  - Schematic design of the QMS

- ## Overview (Skill Management Program)
  - How can we use the SMP ?
  - What dose SMP give ?
  - The SMP for Aircraft Maintenance
  - About our SMP
  - How do you measure a skill ?
  - Sample of the Skill Map and the Skill Matrix
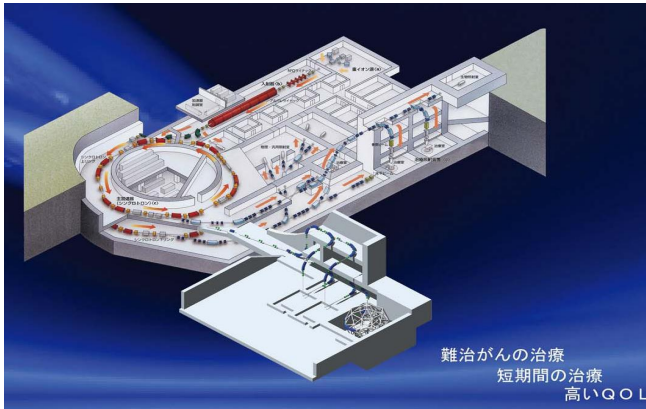 - Conclusion and focus of discussion

Background

Our Facility

Heavy Ion Medical Accelerator in Chiba, HIMAC,.

- The size of the building is 23,000㎡

/ The facility was completed in 1993.
/ The clinical trails were started in 1994.
/ In the present,
- Using for therapy and research
- About 600 patients/ 6,000 hours operation
- Periodic maintenance is twice a year

The supporting partner

AEC, Accelerator Engineering Corporation, is our partner .
Approximately 100 employees are supporting the following task.

Operation and maintenance for the HIMAC

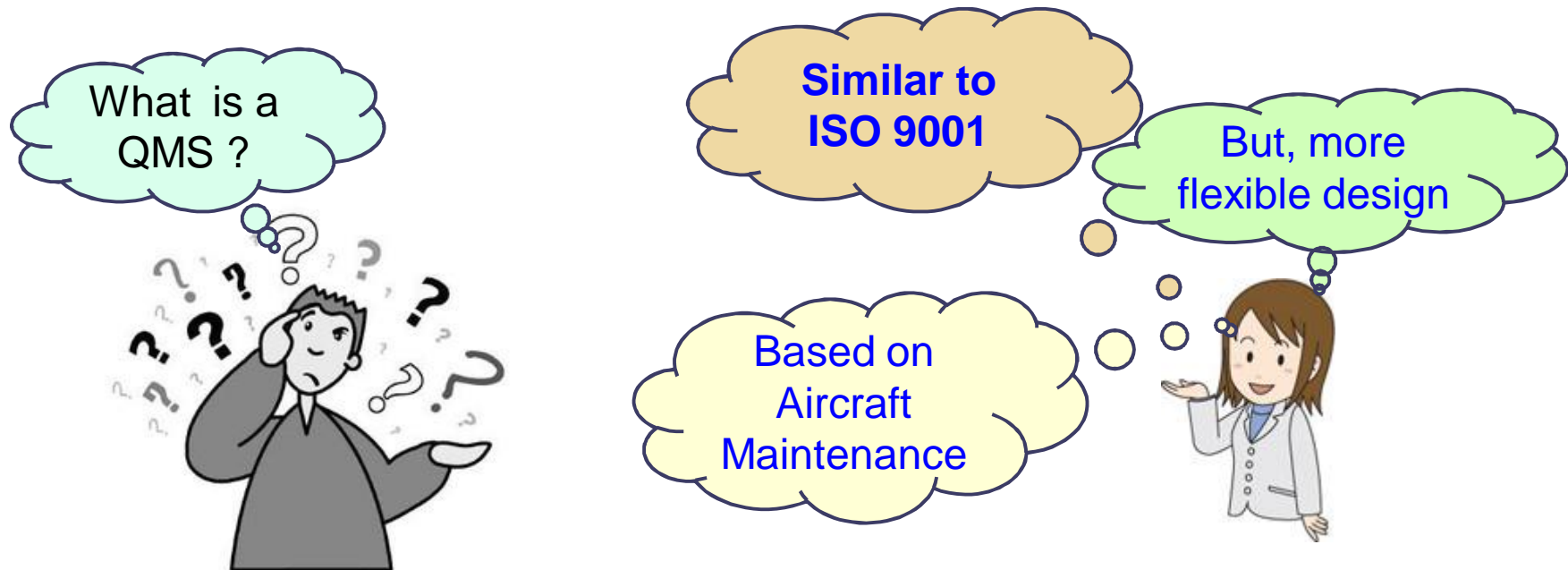Treatment planning

Development of the product

**Going to install
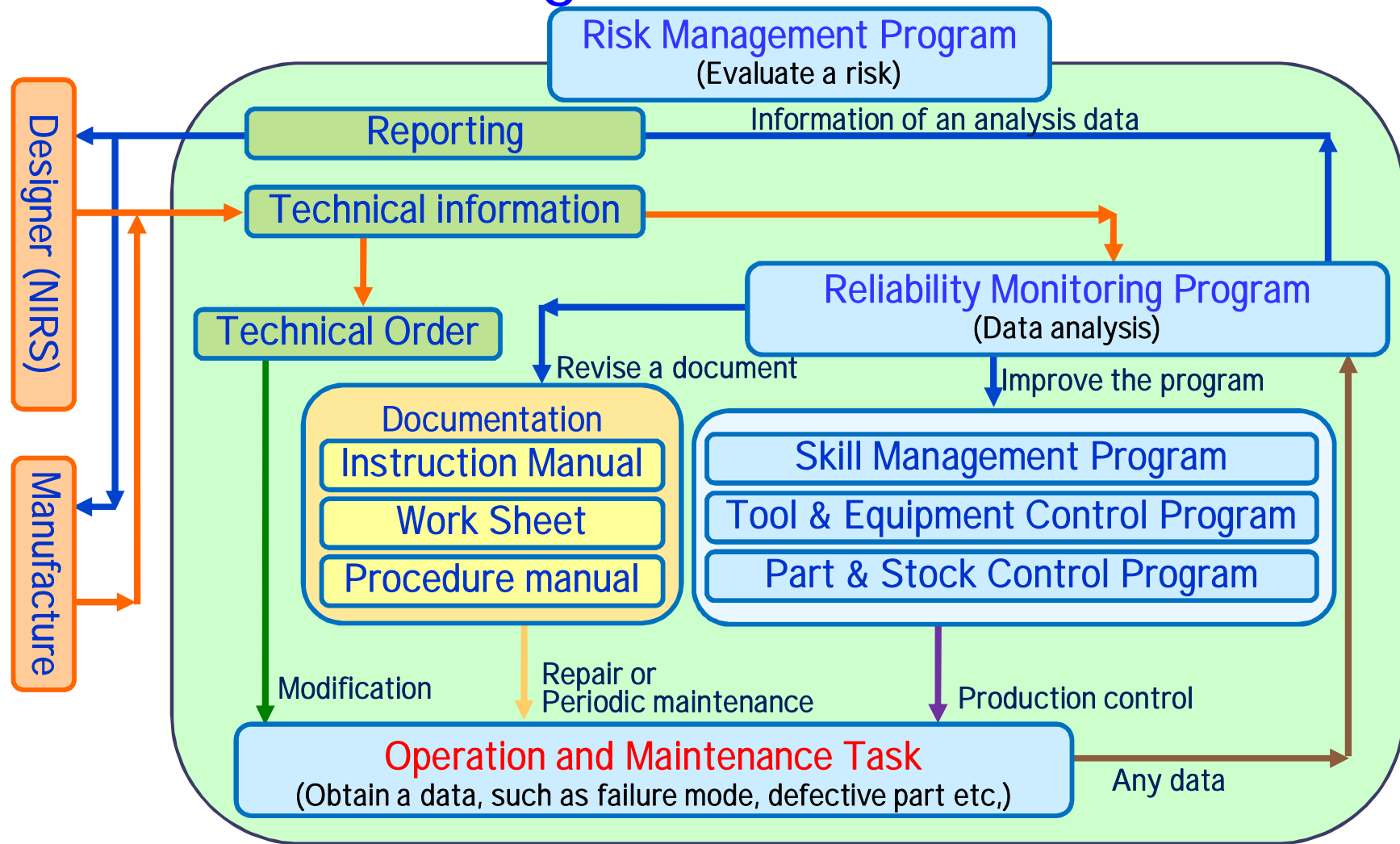the Skill Management Program**

Introduction

What is the SMP ?

The SMP, Skill Management Program, is a part of the QMS, Quality Management System,.

What is a QMS ?

Similar to ISO 9001

But, more flexible design

Based on Aircraft Maintenance

Schematic design of the QMS

Risk Management Program
(Evaluate a risk)

Reporting

Information of an analysis data

Technical information

Reliability Monitoring Program
(Data analysis)

Technical Order

Revise a document

Improve the program

Documentation

Instruction Manual

Work Sheet

Procedure manual

Skill Management Program

Tool & Equipment Control Program

Part & Stock Control Program

Designer (NIRS)

Manufacture

Modification

Repair or
Periodic maintenance

Production control

Operation and Maintenance Task
(Obtain a data, such as failure mode, defective part etc,)
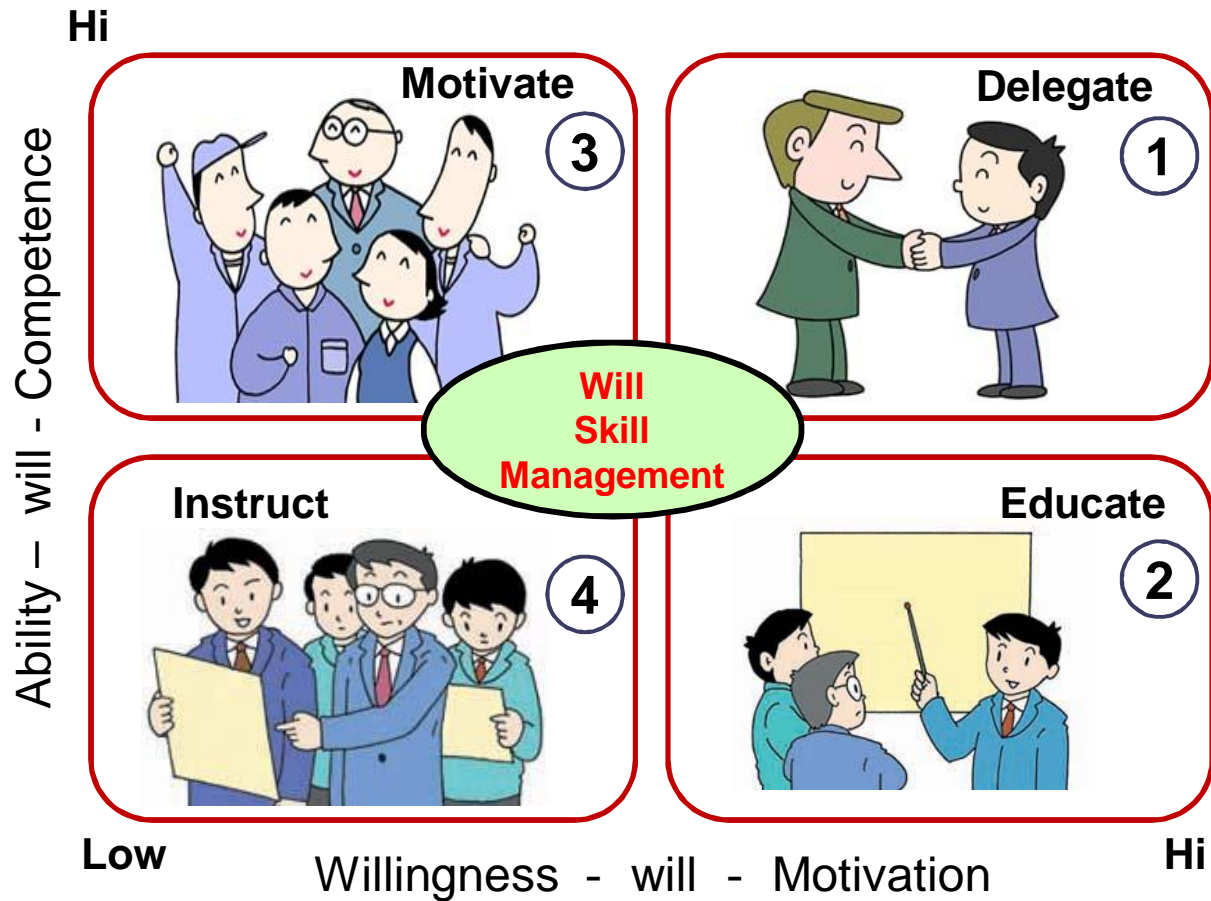
Any data

Overview
Skill Management Program
(SMP)

How can we use the SMP ?

What dose the SMP give ?

For management

Easy job allocation ?

performance Improve ?

- Disclosing every skill
- Easy planning for training
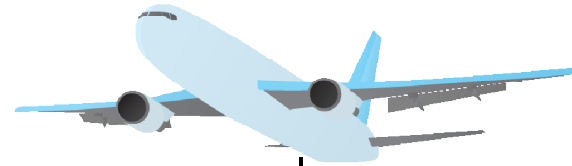- Fostering of skilled person

For individual

I Know my level・・

- Clear aim for skill-up
- Creating professionalism

The SMP for aircraft maintenance

Skill Partitions

Arrival / Departure	Engine Overhaul	Component Overhaul	Airframe / Structure

Skill Level layer

Inspector
1st class Mechanic
2nd class Mechanic
Basic class Mechanic
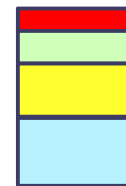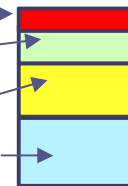
Typical case of Engine Overhaul

Duty & Responsibility	Inspector	2nd class mechanic	Basic class mechanic	1st class mechanic	Inspector
Work Step	Incoming inspection	Disassembly	Cleaning	Assembly	Performance test / Return to service
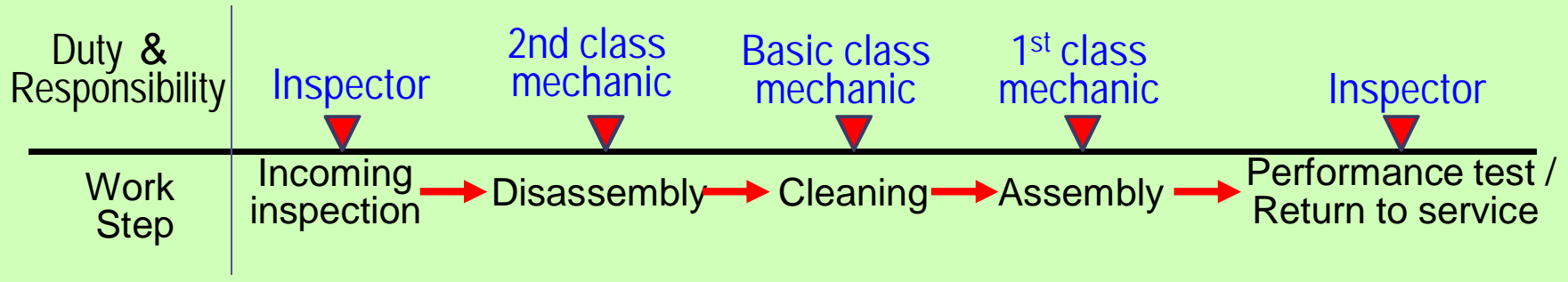
About our SMP

A skill is separated to 6 block, called skill partition.
A personnel skill is consist of 3 levels layer

Skill partitions

Functional partitions

	Injection	Synchrotron	Irradiation support
Operation	**Operation**	**Operation**	**Operation**
Maintenance	**Maintenance**	**Maintenance**	**Maintenance**

Job type partitions

Personnel skill

Top Grade

2nd Grade

Basic Grade
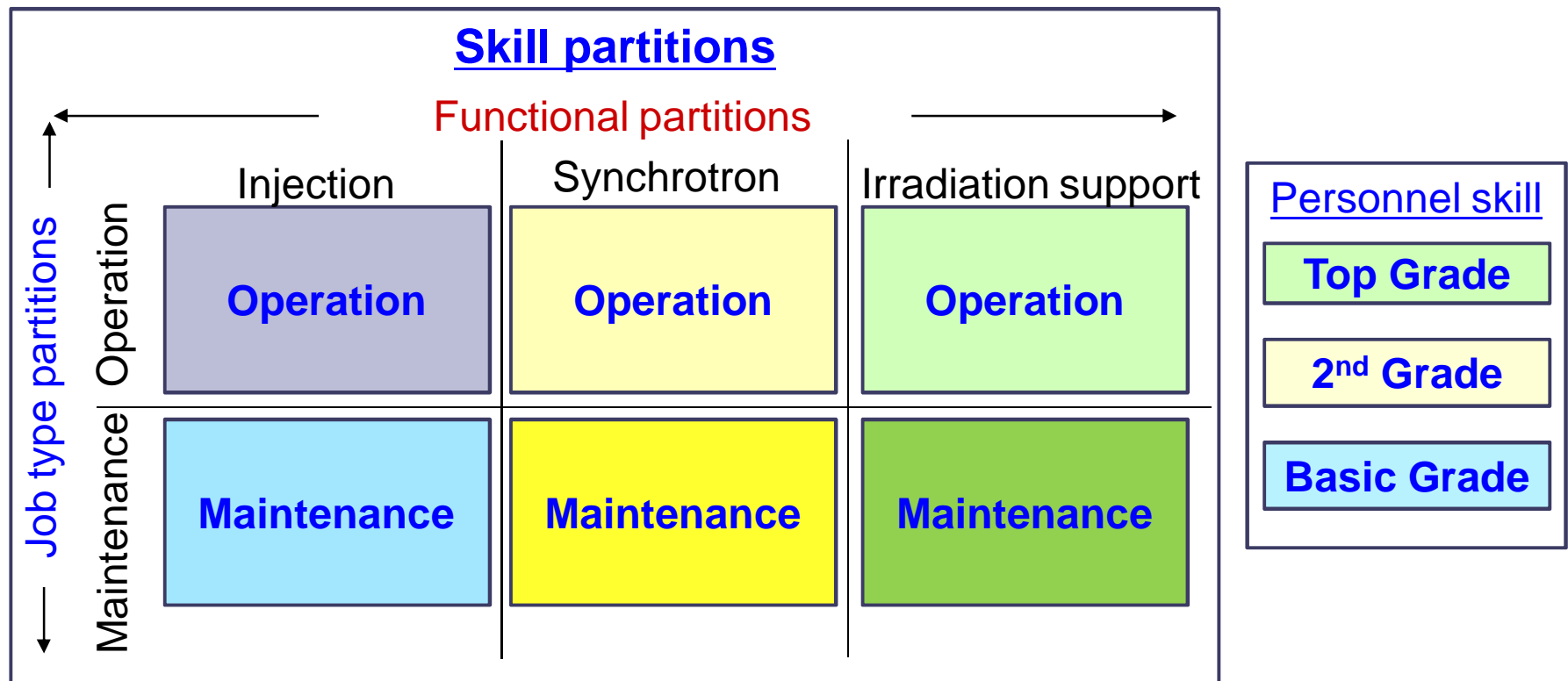
How do you measure a skill ?

SKILL ?

Measuring function of skill is
✓ Knowledge
✓ Technique
✓ Experience

Measuring tools
✓ The skill map is useful to assume individual skill
✓ Interview and/or audit to each person to confirm skill
✓ Management judge the skill level of personnel

SKILL MAP – Task of Injection system operation

Name: Work Grop

\<Operation of Injection system\>

Grade	Essential Skill Items	Training	Auditing	Judgmen
Basic Grade	Assure each divices of the interlock mechanism for safety			
	Monitor the beam by prifile and Emittance monitor on center console			
	Confirm the beam transmission efficiency by faraday cup			
	Record the operation data.			
	Switch to local mode from remote mode on the sub-control panel			
	Load or save the file to controller by using center console			
	Apply the power to the Radio Frequency, RF, system and assure stability			
	Measure the energy of the beam			
	Reset the system and recover			
	Use the oscilloscope			
Second Grade	Troubleshoot the anomaly condition			
	Operate the upper ring and lower ring by the timeshare			
	Calibrate the beam energy at middle energy transpot line			
	Adjust the beam for research using middle energy			
	Calibrate the beam for low energy			
	Adjust the RF when interference occurred			
	Stabilize the beam in ION sources			
	Create the new data file by using center console			
Top Grade	Calibrate the width of the beam by selecting the current of each magnet			
	Calculate the beam oribt in reference to the beam envelop			
	Select proper CFS based on the charge number of ion			
	Irregular operation under the inoperative divice(using adjacence magnetro			
	Calibrate the beam center in each transport line			
	Calibrate the phase and gain of RF system			

SKILL MAP – Task of Injection system operation

Name: Work Grop
＜Operation of ION source＞

Grade	Essential Skill Items	Training	Auditing	Judgmen
Basic Grade	Assure each divices of the interlock mechanism for safety			
	Repot the data sheet of research support for a researcher			
	Switch to local mode from remote mode on the sub-control panel			
	Load or save the file to controller by using center console			
	Reset the system and recover			
	Use the oscilloscope			
Second Grade	Troubleshoot the anomaly condition			
	Create the stabilized beam with proper vacuum and gas volume			
	(HEC) Create the afterglow			
	(PIG) Recover the power when interraption occurred			
	(HEC) Remove and install the ferrocene container to minimize the consum			
Top Grade	Free running and monitor the ion source for ageing			
	(PIG) Adjust the gap between filament and cathode of the PIG head			
	Troubleshooting the cause of unstabilized beam			
	Create ionic species corresponding to specific gas			

Sample of the Skill Matrix for individual

Individual Skill Matrix

Group	Job title	Name

History (Describe business contents before the employment)

Date	Company name	Category	Business content

History of the HIMAC

Division	Group	Priode	Work experience

Licence

The partition is separated by the functions

HIMAC Skill

injection		Operation	Calculation	Control	Power	Cooling	Vacume	Monitor	RF	ION Source	Ion sys
	Basic	★	★	★		★		★	★		
	Second	★	★			★		★			
	Top	★				★					
SYN/HEBT		OPeration	Calculation	Control	Power	Cooling	Vacume	Monitor	RF	Synchro	Transpot
	Basic										
	Second										
	Top										

My skill

Certification is given to each sub partition

Conclusion

- The SMP is a part of Quality Management System that give us a number of benefit .
- The SMP gives motivation to an Operator or maintenance person .
- Also, the SMP gives the improving of the team performance to a management.

The focus of Discussion

- How do you maintain operator 's skill ?
- How do you give the incentive to the operators ?

Thank you
for your attention !