

Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: IG DEP Development of Wireless Sensing System for Factory

Date Submitted: March 10, 2015

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Re: IG DEP Development of Wireless Sensing System for Factory

AbstractDevelopment of Wireless Sensing System for Factory

Purpose: This document has been prepared for response to call for interest(CFI) of IG-DEP(Dependability).

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IEEE 802.15 IG DEP
Review of Responses to Call for Interest(CFI)

**Development of
Wireless Sensing System
for Factory**

Berlin, Germany

March, 2015

Hiroshi Kobayashi, Nissan Automotive

Agenda

Background

New Type of Equipment Diagnosis
System by using wireless sensor
devices

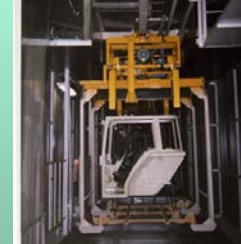
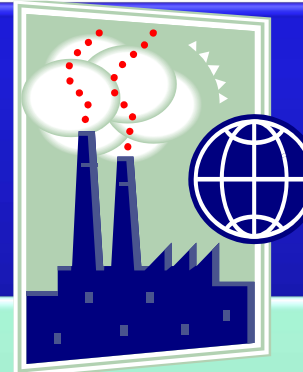
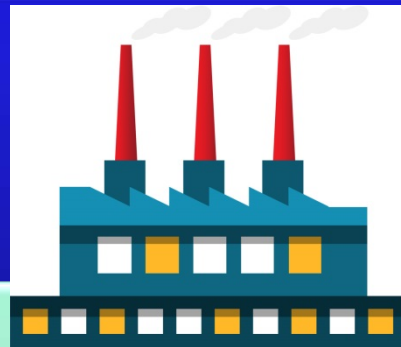
Required specification

Future Activity

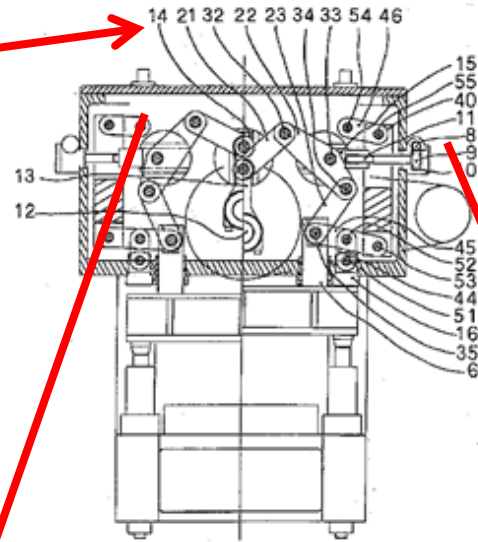
Background

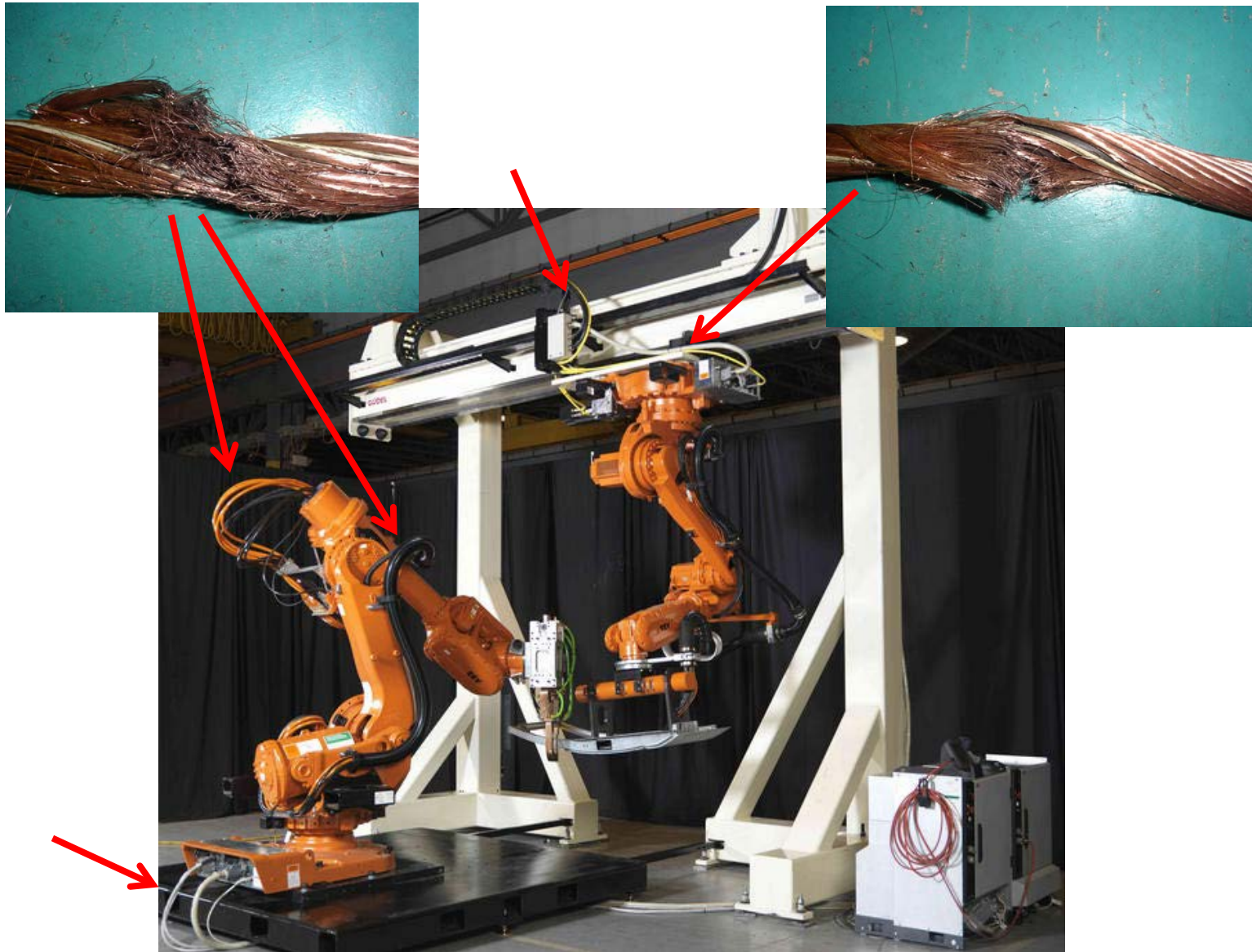
Reduce Cost

Improve OEE



Reliability





Agenda

Background

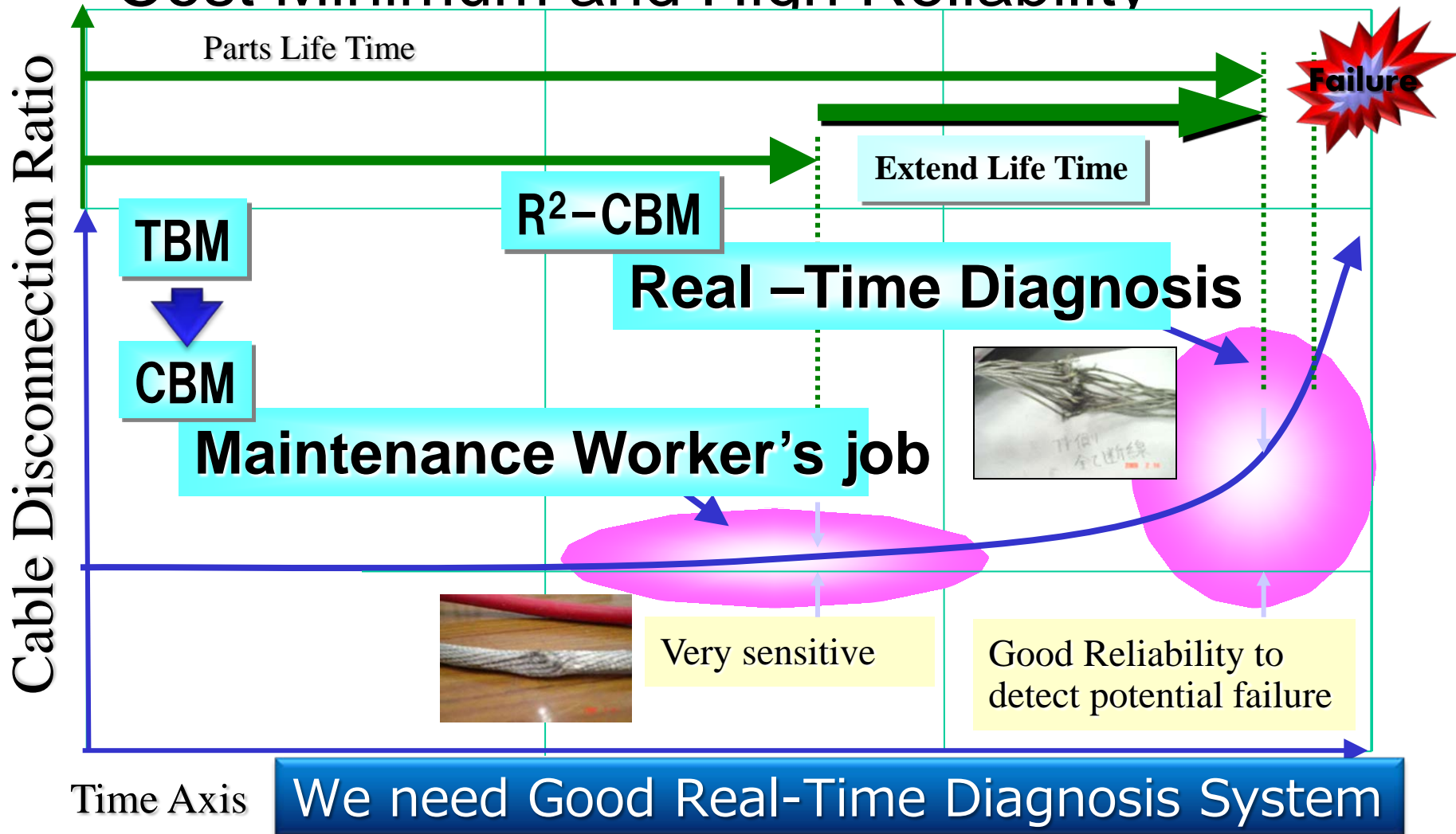
New Type of Equipment Diagnosis
System by using wireless sensor
devices

Required specification

Future Activity

Concept for Equipment Diagnosis System

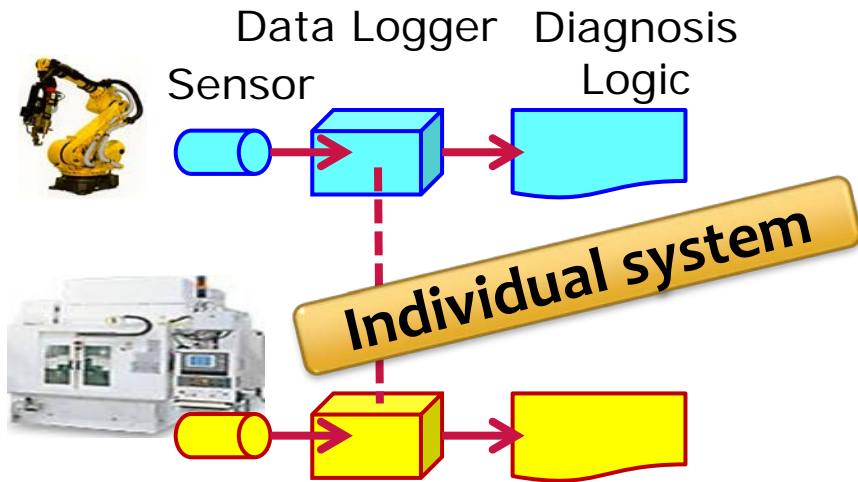
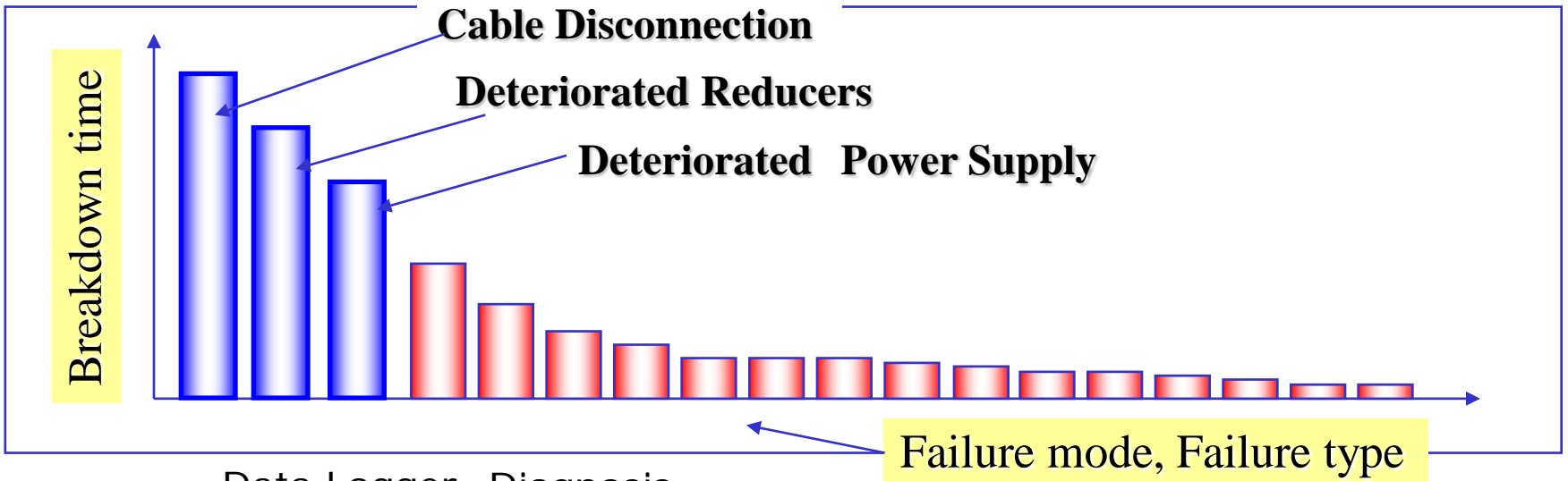
Cost Minimum and High Reliability



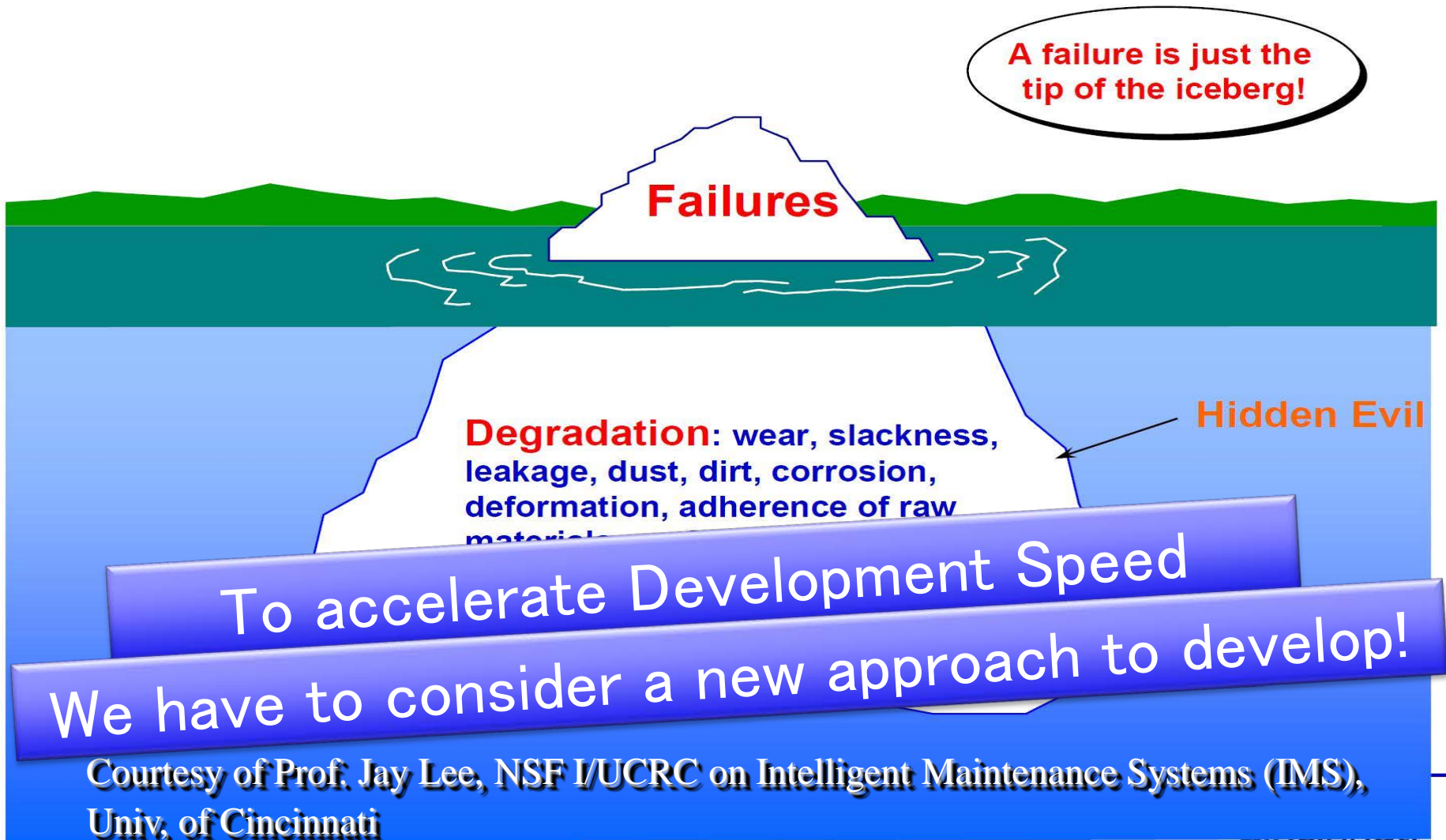
We need Good Real-Time Diagnosis System

New approach to develop “Diagnosis system”

< Conventional Development Procedure >



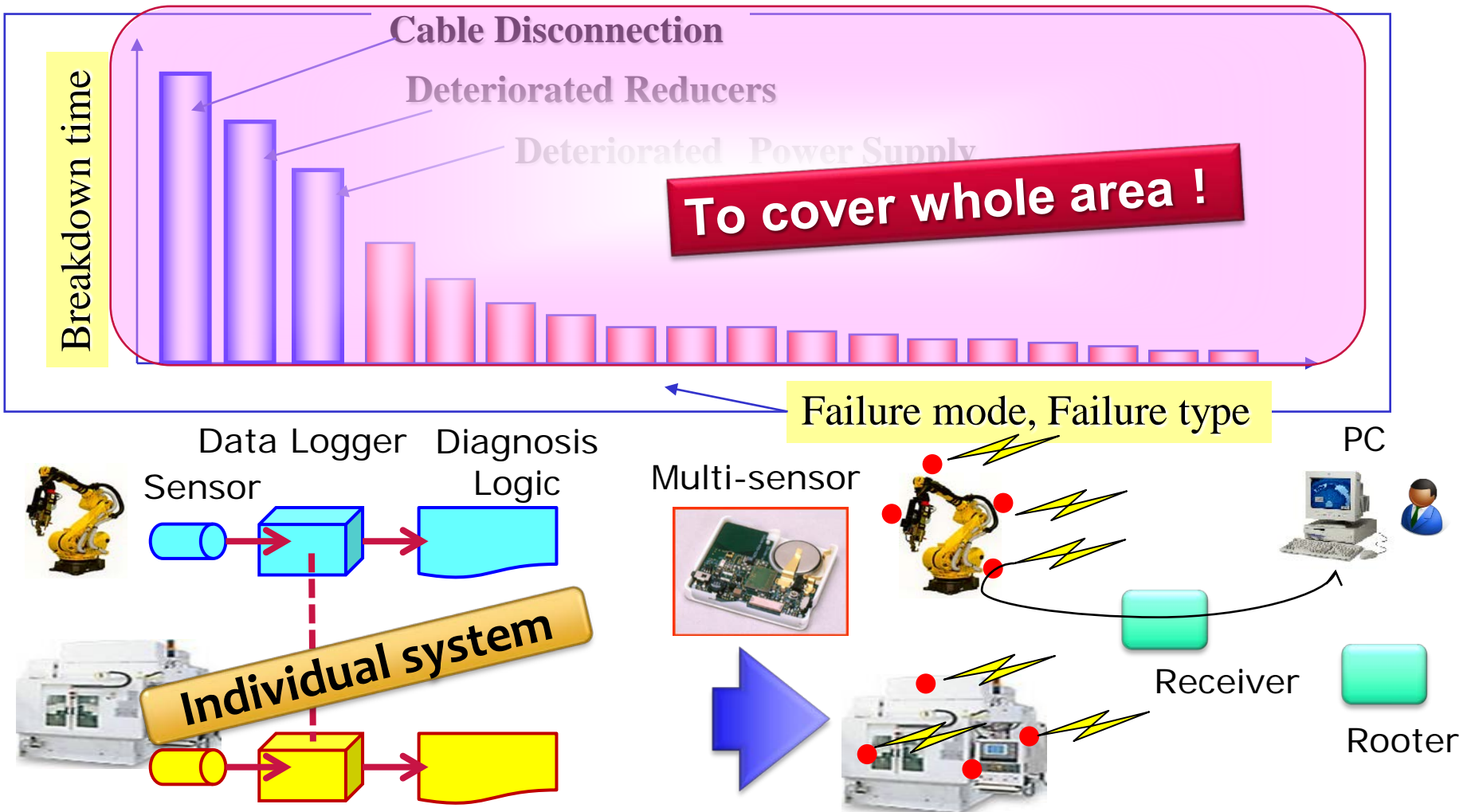
Unmet Needs and IMS Opportunities (The Iceberg Model)



Courtesy of Prof. Jay Lee, NSF I/UCRC on Intelligent Maintenance Systems (IMS),
Univ. of Cincinnati

New approach to develop "Diagnosis system"

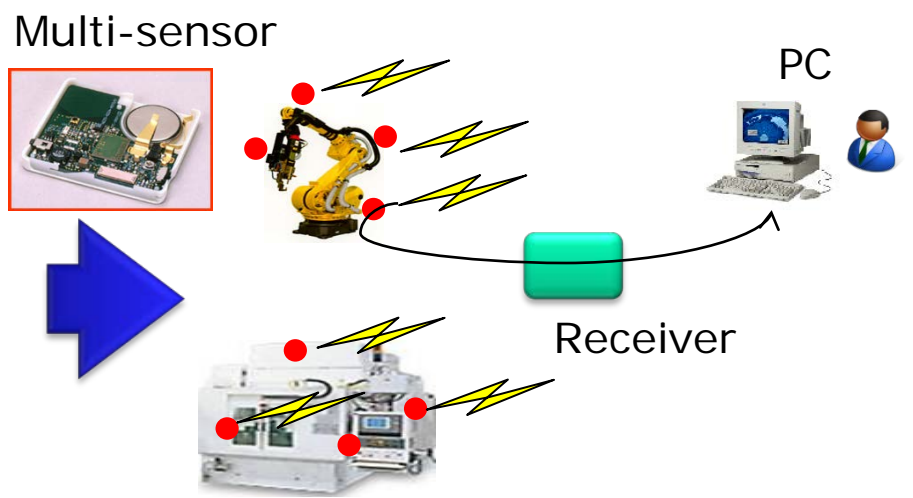
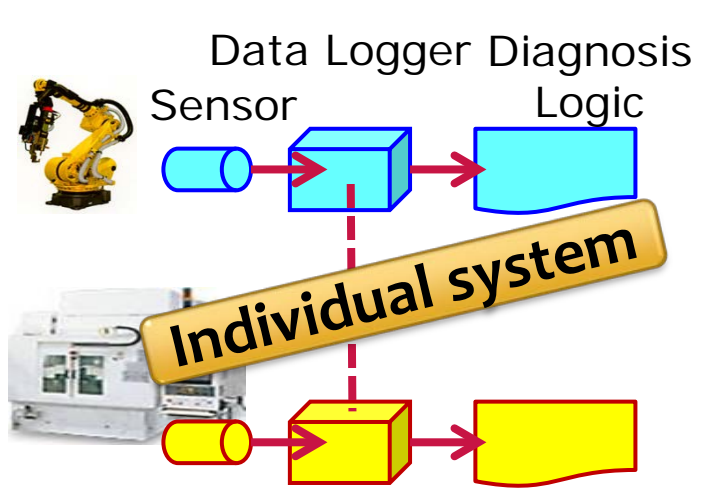
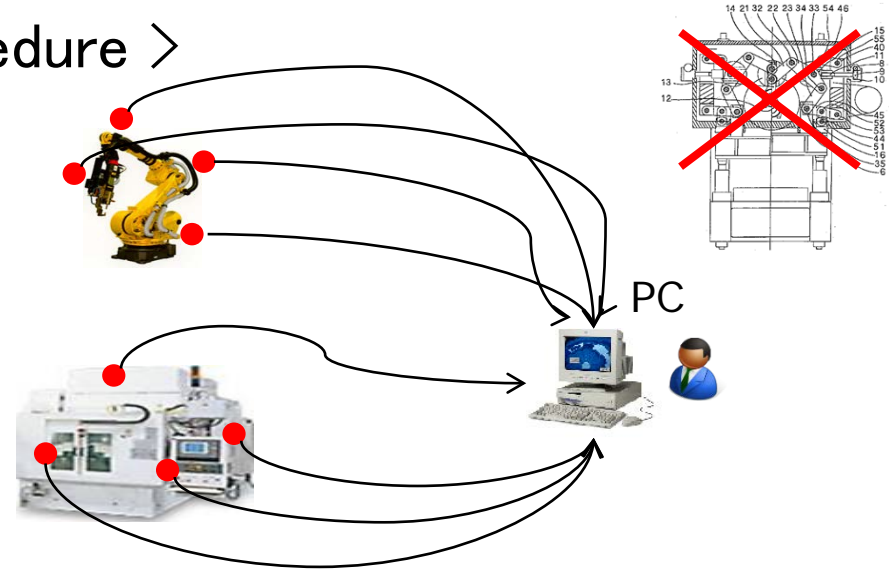
< Conventional Development Procedure >



New approach to develop “Diagnosis system”

< Conventional Development Procedure >

- Installation Issues
- Installation Cost
- Restriction of installation
- Reliability of wires



Agenda

Background




New Type of Equipment Diagnosis
System by using wireless sensor
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Future Activity




Required specification

3 type of Diagnosis System

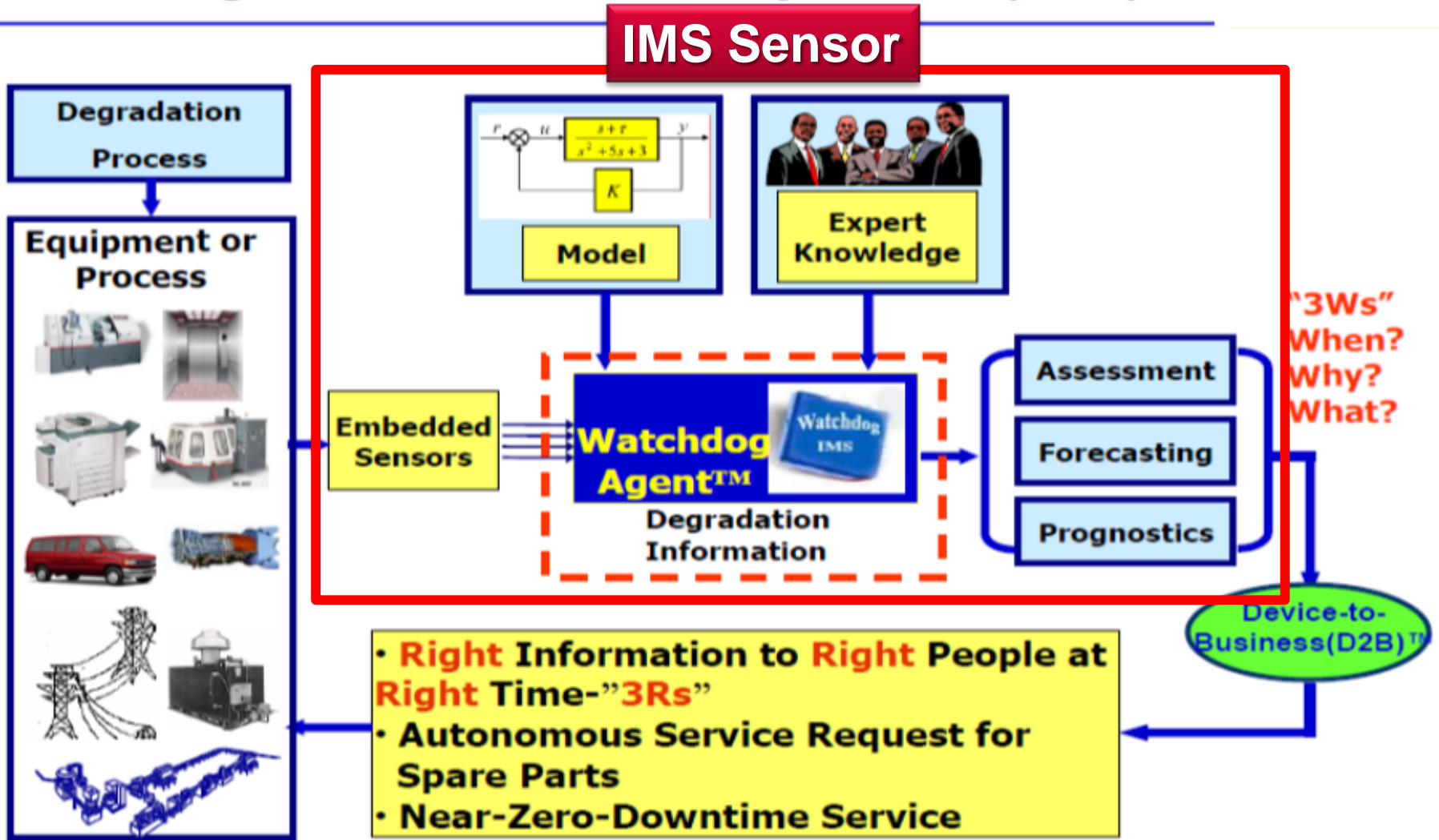
1. Equipment Diagnosis System in Real-time with rea-time feedback 
 1. Real-time measuring
 2. Judge immediately with a certain threshold level
2. Equipment Diagnosis System in Real-time (1) 
 1. Real-time measuring and sending data in real-time
 2. Judge based on the comparison with the past data
3. Equipment Diagnosis System in Real-time (2) 
 1. Real-time measuring and sending data **intermittently**
 2. Judge based on the comparison with the past data

Required specification

3 type of Diagnosis System




1. **Equipment Diagnosis System in Real-time with rea-time feedback** 
 1. **Real-time measuring**
 2. **Judge immediately with a certain threshold level**
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Intelligent Maintenance Systems (IMS)

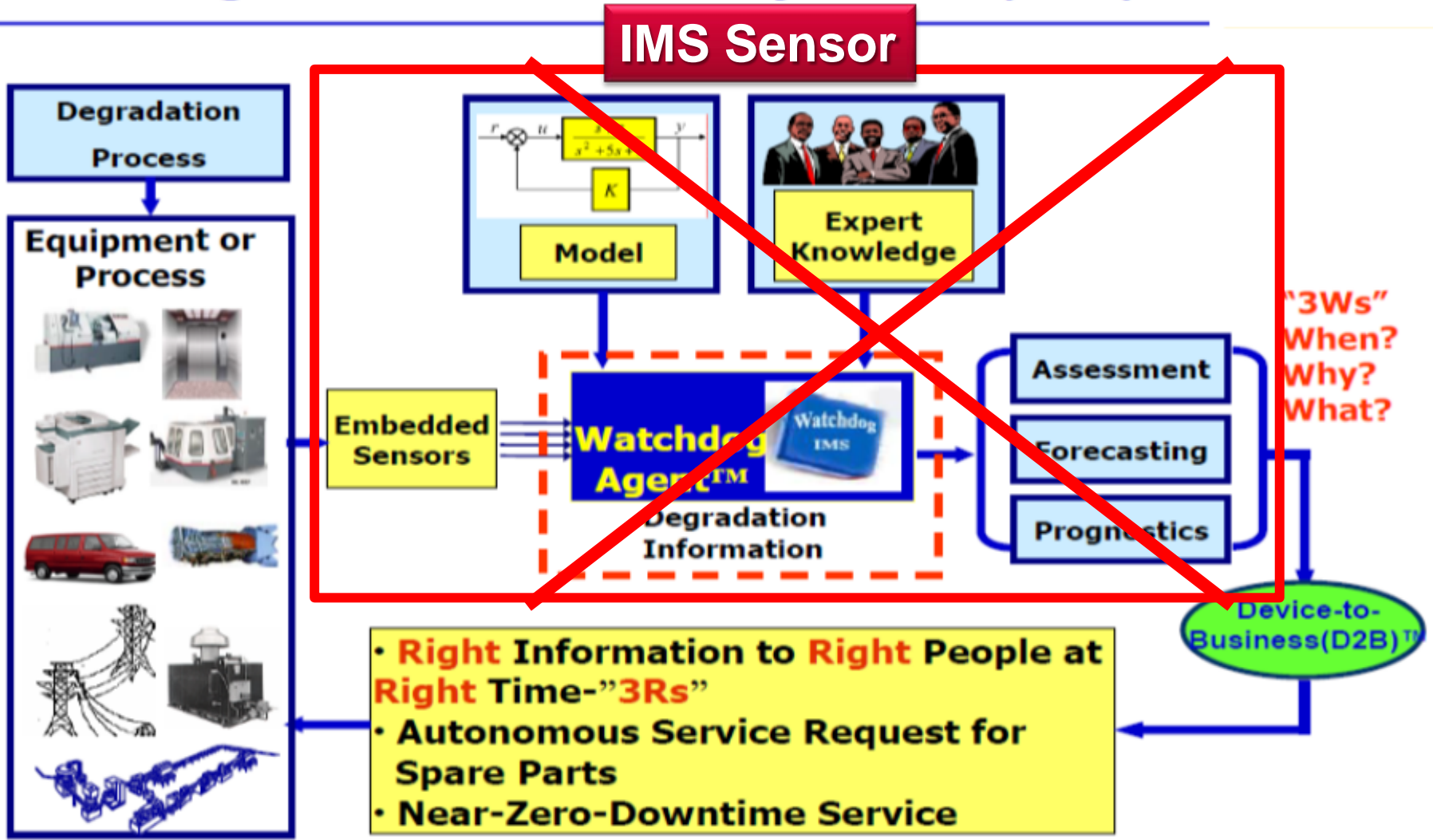


Required specification

3 type of Diagnosis System

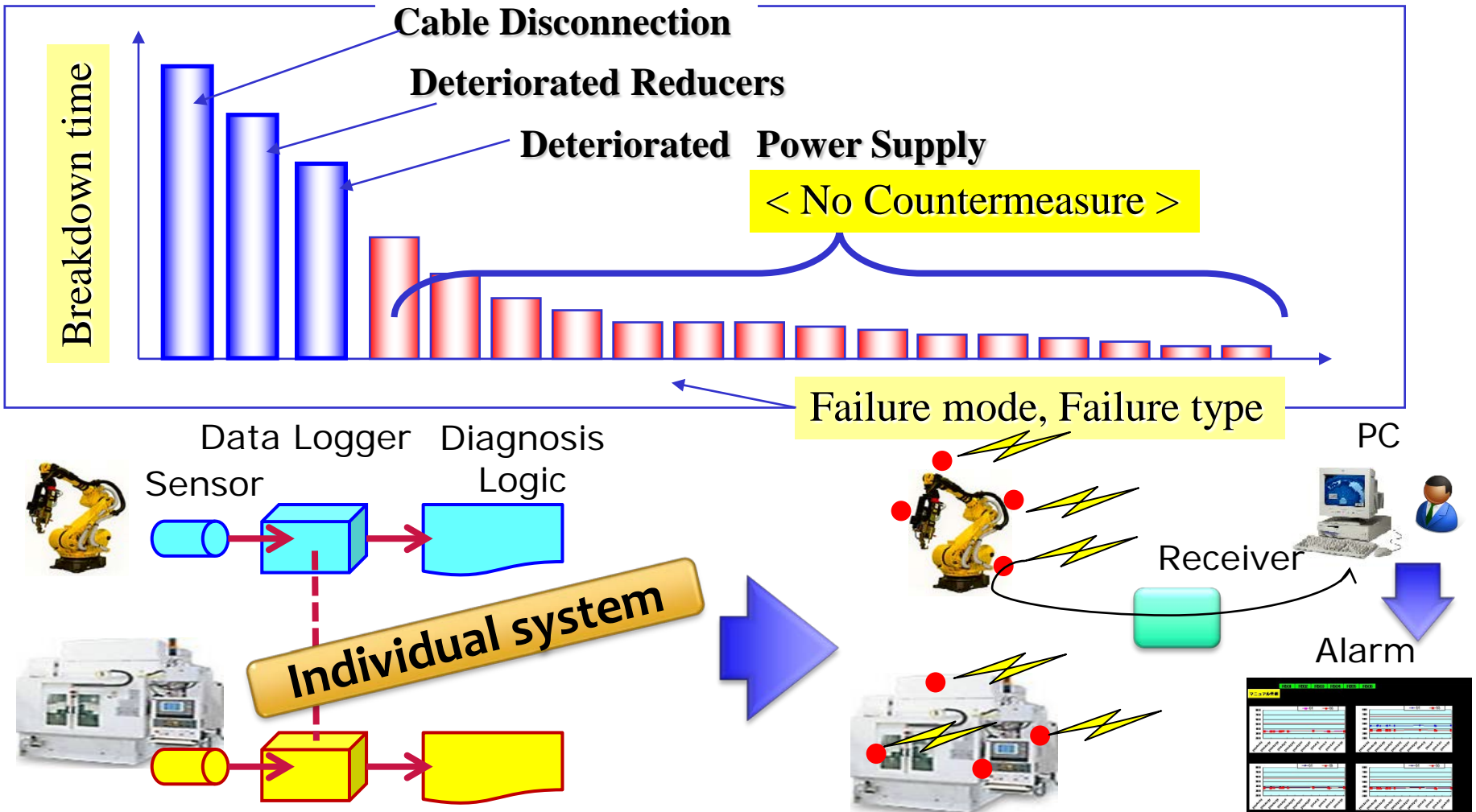
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Intelligent Maintenance Systems (IMS)



New approach to develop "Diagnosis system"

< Conventional Development Procedure >



Required specification

Specification for Equipment Diagnosis System

1. Response

1. Real-time measuring function to communicate with receiver in real-time
2. Judge immediately with a certain threshold level

2. Energy consumption

1. In order to prolong a life time of measuring device save energy and have good efficiency regarding communication power * At least 1 year or more

3. Bilateral communication ability

1. In order to change some parameters in the device
2. and give some triggers to start and end measuring from outside

Required specification

Specification for Equipment Diagnosis System

4. Distance to communicate with devices

- 1) In order to reduce the number of receivers device have to have some distance to communicate. At least 20m or more

5. Data transfer speed

- 1) This sensor will have multi-sensors. So data transfer speed is very important.

6. Communication capability with many sensors

- 1) How many sensors can communicate at the same time

7. Kinds of Sensors

- 1) Vibration sensor
- 2) Thermal sensor
- 3) Voltage
- 4) Current
- 5) AE

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Required specification

The type of Diagnosis System

1. **Equipment Diagnosis System in Real-time with rea-time feedback**
 1. **Real-time measuring**
 2. **Judge immediately with a certain threshold level**
2. **Equipment Diagnosis System in Real-time**
 1. **Real-time measuring**
 2. **Judge based on the comparison with the past data**