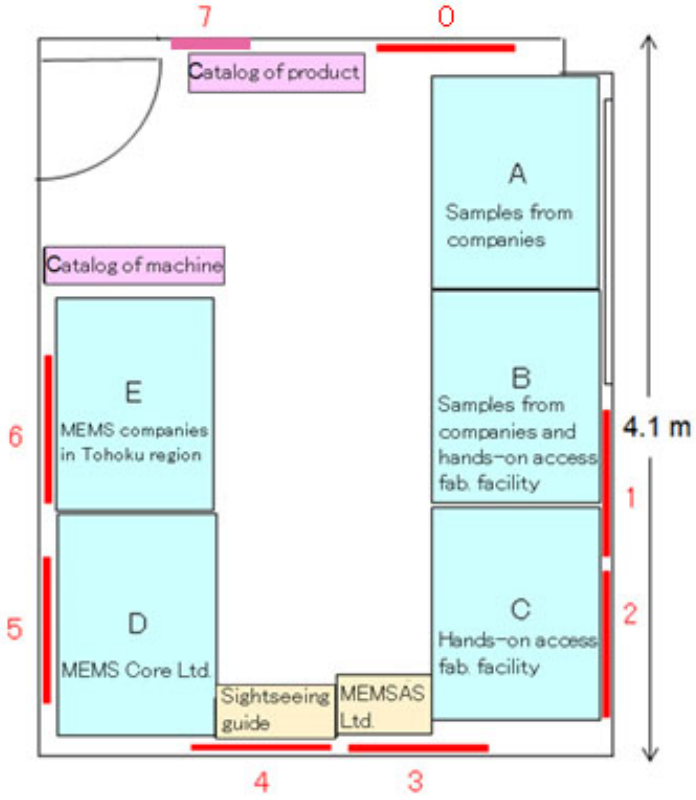
Business matching room



Poster

0 Business matching room
1 Hands-on-access fab. (Prof. K. Totsu)
2 Hands-on-access fab. Equipment
3 MEMSAS Inc
4 MEMS CORE Co. Ltd (1)
5 MEMS CORE Co. Ltd (2)
6 MEMS company map in Tohoku region
7 Member companies of MEMS park consortium

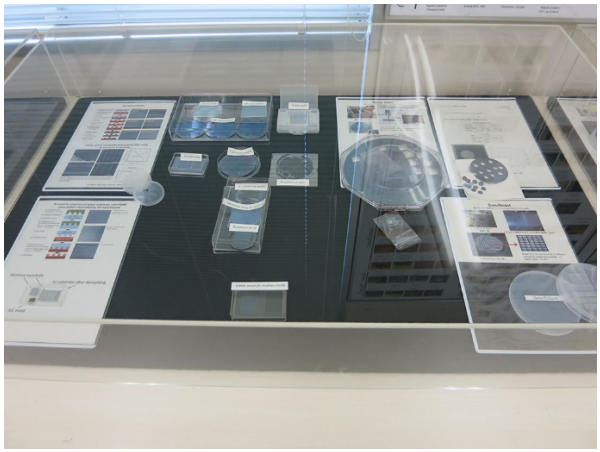
View from the entrance

Catalogs of products for business matching

Commercialization of developed equipment (ALD、bonding、CATCVD)

Samples for packaging (Tanaka Kikinzoku Kogyo、NGK, Nikko)

Hands-on access fab.



Nanoimprint, Sandblust, Water laser

Each process steps in the wafer fabrication

MEMSAS Ltd. (Minimal invasive medicine)

Sightseeing information of Sendai city

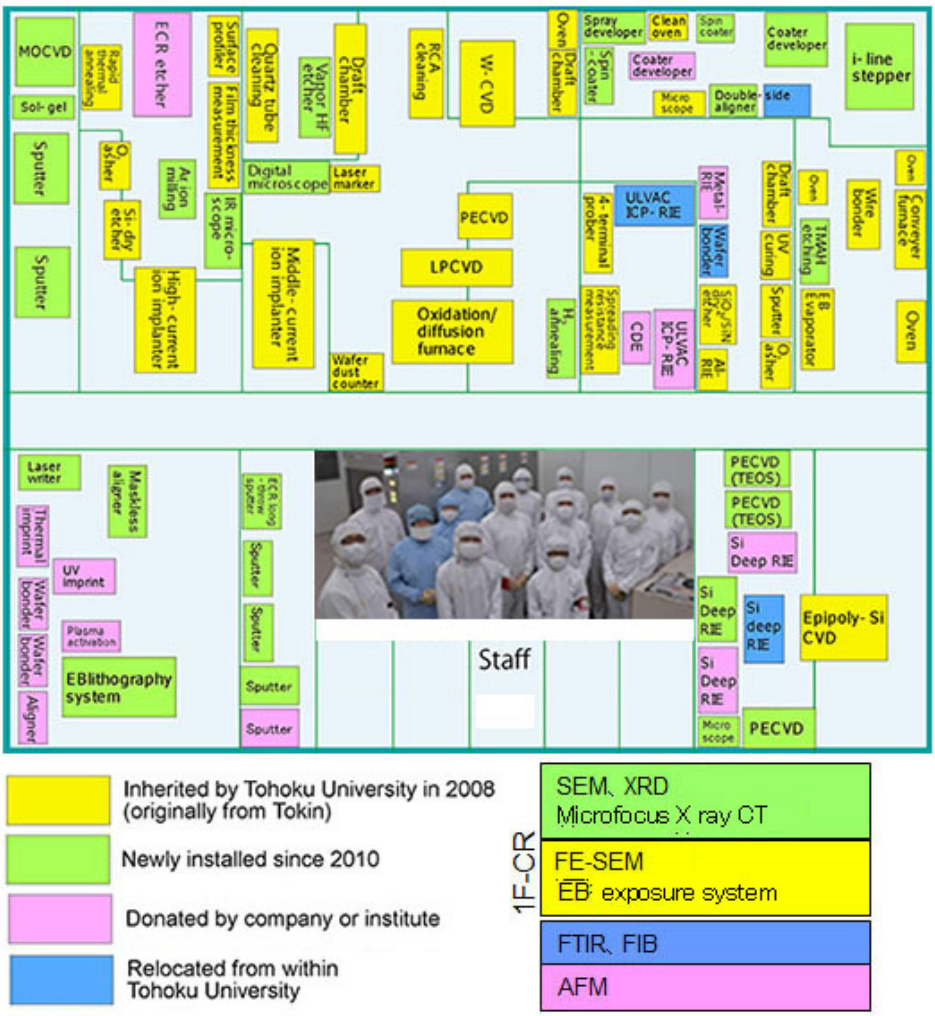
MEMS Core Co. Ltd. (Contract development of MEMS)

MEMS company map in Tohoku resion

1 Hands-on-access fab. (Prof. K. Totsu)

Shared facility for industry to prototype MEMS devices (4 / 6 inch). Companies which cannot prepare their own facility dispatch their employees to operate equipments by themselves. The facility is located in 1800m^2 clean room, which was used for the production of power transistor and newly installed MEMS fabrication equipments. http://www.mu-sic.tohoku.ac.jp/coin/index.html

Contact person: Professor Kentaro Totsu Phone 022-229-4113, totsu@mems.mech.tohoku.ac.jp



Patterning (I line stepper)

Oxidation, diffusion

Dry etching (DRIE)

Inherited by Tohoku University in 2008 (originally from Tokin)

Newly installed since 2010

Donated by company or institute

Relocated from within Tohoku University

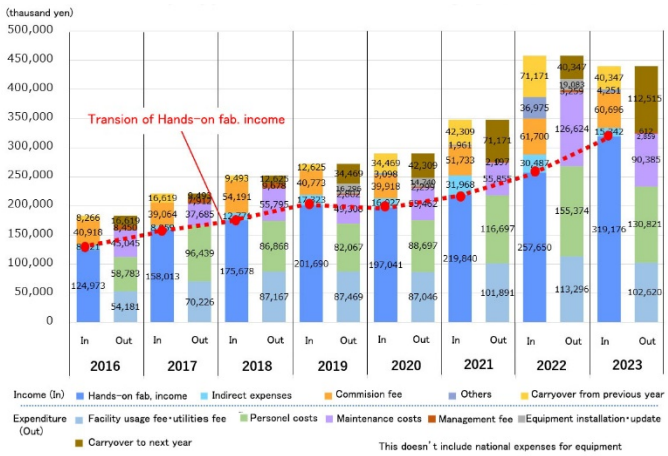
1F-CR

SEM、XRD
Microfocus X ray CT

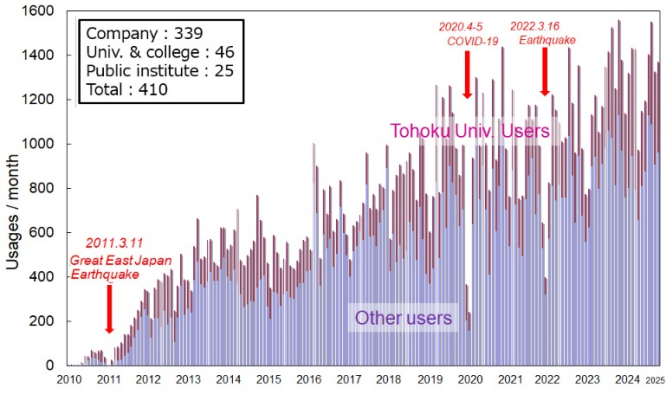
FE-SEM
EB exposure system

FTIR、FIB

AFM



Transition of income and expenditures



Transition of user number

2 Hands-on-access fab. Equipment

Draft chamber
~6"
HF/HNO$_3$/H$_2$SO4/HCl etc.

Vacuum oven
~6"
Yamato DP-31

Brush scrubber
~6"
Zenkyo
post polishing

Spin dryer
4", 6"
SEMITOOL PSC101 x3

Spin dryer
~6"
Toho Kasei ZAA-4 x2

Inert oven
~6"
Yamato DN63H

UV curing
~4"
Ushio UMA-802

Curing oven
~6"
Yamato DN43H

Pattern generator
~6"
NSK TZ-310
For emulsion / Cr mask
making, up to 7inch

Laser writer
~9"
Heidelberg instruments
DWL2000CE

Spin coater
~6"
Actes ASC-4000 x2
Mikasa 1H-DXII x2

Clean oven
~6"
Yamato DE02 x2

EB lithography
~6"
Elionix ELS-G125S
Max130keV, 4nm, up to 6"

Stepper
4", 6"
Canon FPA1550M4W
g line, 0.65μm, 4inch

Double-side aligner
~6"
Suss MA6/BA6 x2

Spray developer
~6"
Actes ADE-3000S
8 inch, vacuum/mechanical
chuck

Oxidation/diffusion
furnace
~6"
TEL XL-7

Middle-current ion
implanter
~4"
Nissin ion NH-20SR
Max. 180keV, 0.6mA

Annealing
~6"
AG Associates AG4100
1000℃

Metal diffusion
furnace
~4"
Koyo lindberg Model270

Asher
~6"
Branson IPC4000
13.56MHz, 600W

Plasma cleaner
~6"
Yamato PDC210

Surface planer
4", 8"
Disco DAS8920

Water laser
~8"
Shibuya LAMICS AQL-1900

Wafer polisher
~6"
BN technology
Bri52, Bri62

Electroplating
~6"
Yamamoto
Cu, Ni, Sn, Au

Wafer bonder
~6"
Suss SB6e

Dicer
~6"
Disco DAD522密

Wire bonder
Chip
West Bond etc.
Al, Au

Reflow furnace
~4"
Shinko FB-260H/TE

Laser marker
~4"
GSI WM-II

Sand bluster
~6"
Shinto

Wafer aligner
8"
EVG Smart View

Wafer bonder
8"
EVG 520

Epoxy injection
chamber
8"
EVG 520

UV imprinting
~4"
Toshiba machine ST50

Thermal imprinting
~50mm
Origin electric Reprina-T50A
MAX 650°C, 30kN

TOF-SIMS
CAMECA TOF-SIMS IV

FIB
~3"
SII SMI9200

AFM
~8"
Digital Instruments
Dimension3100

LP-CVD
~6"
Kokusai
SiN, Poly-Si, NSG

熱CVD
~6"
Kokusai
Epi-Poly Poly-Si, 1100°C

PE-CVD
~6"
JPEL VDS-5000
SiN, SiO_2

PE-CVD
~8"
Sumitomo MPX-CVD
SiN, SiO_2

PE-CVD
~8"
Sumitomo MPX-CVD
TEOS SiO_2

Sputtering
~6"
Anelva SPF-730
8inch target x3
Al, AlSi

Sputtering
~8"
Shibaura CFS-4ES II
3inch target x 3
Stage cooling x1, heating x1

Sputtering
~8"
Shibaura I-Miller
3inch target x 4, Load lock,
Automatic transfer x 10 wafers

W-CVD
4"
Applied materials
Precision 5000

EB evaporation
~6"
Anelva EVC-1501

Automatic sol-gel
deposition
~4"
Technofine PZ-604

MOCVD
~8"
Wacom Doctor-T
PZT, up to 8inch

Sputtering
(high temp.)
8"
Youtec 21-0604

ALD
~6"
Technofine ALK-600

ICP－RIE
~6"
ULVAC NE-550

Chemical dry etcher
(CDE)
~4"
Shibaura CDE-7

Si Deep-RIE x4
~8"
Sumitomo MUC-21
SF_6, C_4F_8

Dry etcher
~6"
Anelva DEA-506
For SiN, SiO2 etching

Dry etcher
4"
Anelva L-507DL
For Si etching

Al RIE
4"
Shibaura HIRRIE-100
Cl_2, BCl_3

RIE
~6"
Ulvac RIH-1515Z
Cl2, BCl3, SF6, CF4, CHF3,
Ar, O2, N2

ECR etcher
3"
Anelva ECR9001
3 inch GaAs, AlGaN, etc

Vapor HF
~8"
Sumitomo Primaxx uEtch

KOH･TMAH
~6"

Ar ion milling
6" x 4, 4" x 6
NS, Hakuto 20IBE-C

Wafer dust counter
~6"
Topcon WM-3

Film thickness
measurement
~6"
Nanometric
NanoSpec 3000

Surface profiler
~6"
Dektak8
Tencher AlphaStep 500

Depth measurement
~6"
Union Hisomet

4-terminal probe
~6"

Spreading resistance
measurement
Solid State Measurements
SSM150

IR microscope
~6"
Olympus, Hamamatsu

Laser/white light
confocal microscope
~6"
Lasertec
OPTELICS HYBRID L3-SD

Digital microscope
~8"
Keyence and Kunoh

SEM
~12"
Hitachi S3700N
EDX

FE-SEM
Chip
Hitachi S5000

Ellipsometry
~6"
Photonic lattice SE-101
ULVAC

X-ray micro CT
~6"
Comscan techno
ScanXmate D160TS110

Ultrasonic
microscope
~12"
Insight IS350

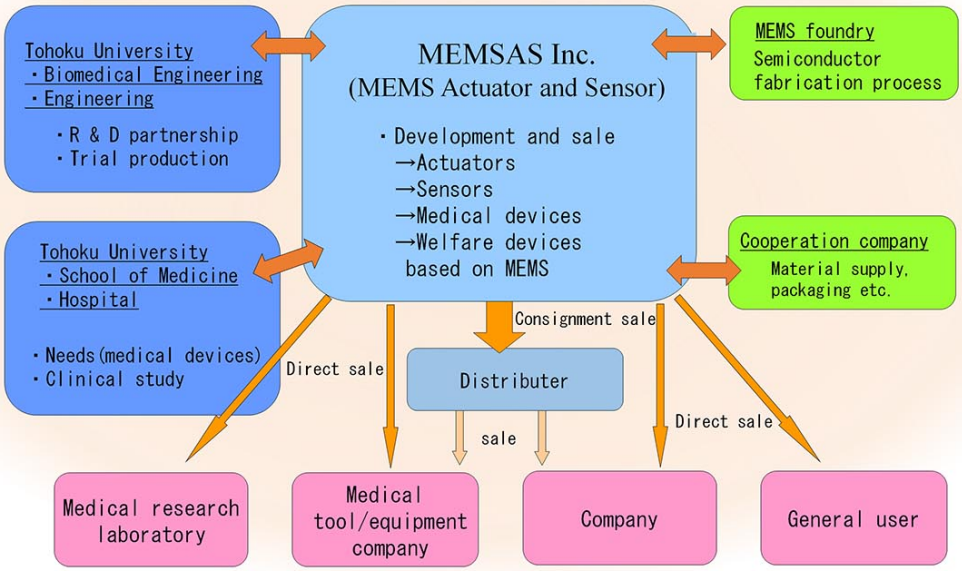
Line-focus-beam
acoustic
microscope

3 MEMSAS Inc.

MEMSAS Inc.

→Products (sensors and actuators based on MEMS)

→Technical support



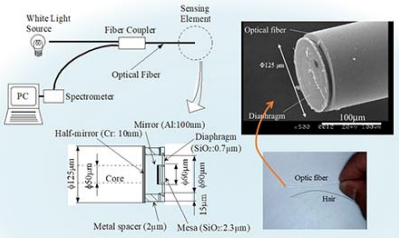
MEMSAS,INC. is the venture company on the purpose of application development, manufacturing consulting, and sales for sensor and actuator which are fabricated based on MEMS(Micro Electro Mechanical Systems) technology. We have developed the tip of catheters equipped with small movement mechanism for minimally invasive instruments that performs inspection and medical treatment safely by controlling the movement and micro pressure sensor(which is very thin like hair) from outside. By applying small movement mechanism, we also have developed 2-Dimensional tactile display (Pin Display) for visually impaired persons. Concerning basic research and development, we actively utilize the research environment of Tohoku University by conducting an animal experiment and evaluating the trial production for medical instruments in Graduate school of Biomedical engineering, Tohoku University.

About MEMSAS

Name :	MEMSAS Inc. http://www.memsas.co.jp
Established :	September 29th, 2004
Location :	#1003, 1-6-22, 1 ban-cho Aoba-ku Sendai-shi Miyagi, Japan, 980-0811
Board Members :	Representative director: Kazuya Kato Director: Masayoshi Esashi, Yoichi Haga, Tadao Matsunaga, Kentaro Totsu Corporate auditor: Nobui Mishina

Products

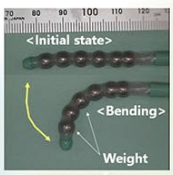
Sensors based on MEMS



Ultra-thin fiber optic pressure sensor

For the purpose of local pressure measurement in a very narrow space, ultra-miniature fiber-optic pressure sensor of 125μm in diameter has been developed. Thin diaphragm which is bonded at a tip of the optical fiber is deformed by applying a pressure, and the deformation changing is measured interferometrically. In particular, fiber-optic pressure sensors have the advantages of not only high potential of miniaturization but also applicability to use in such electromagnetically harsh environments as in an operating room in a hospital.

Actuators using Shape Memory Alloy (SMA)

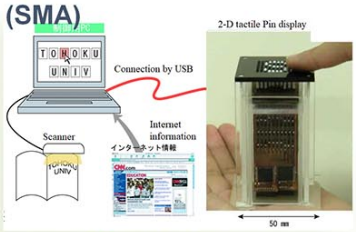


Active bending mechanism for ileus tubes

Ileus tube is used for the ileus treatment. Bending mechanism utilizing SMA actuator, which is assembled at a tip of the tube, can make pylorus passing easy.

Active bending electronic endoscope

For inspection and treatment inside of the small intestine Disposable endoscope has been developed by combining small electrical imager and bending mechanism using SMA actuator.



2-D tactile pin display

Two-dimensional tactile pin display has been developed for visually impaired people. Character and graphic information is dynamically displayed by an array of pins in up and down positions. The contraction of SMA micro-coil actuators moves the pins up and down, and latch mechanism using a permanent magnet accurately positions the pins in an up or down state without any feedback control.

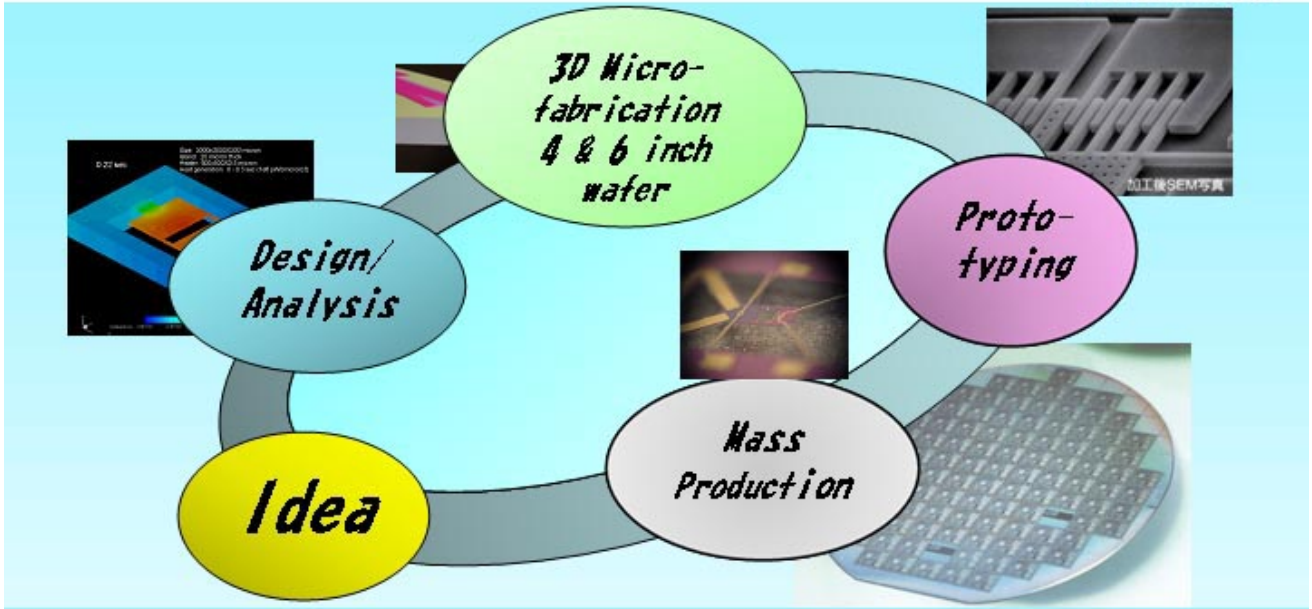
Contact
Yoichi Haga, haga@tohoku.ac.jp
Tadao Matsunaga, matsunaga@tohoku.ac.jp
Graduate school of biomedical engineering, Tohoku University

4 MEMS CORE Co. Ltd (1)

Turn the Idea into Product

Always with you

MEMS CORE



Company Profile

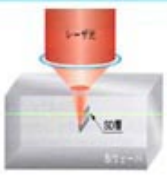
Name : MEMS-CORE Co.Ltd.
Capital : 60,000,000 JPY Foundation : Dec. 2001
CEO : Koji Homma
Address : 3-11-1 Akedouri Izumi-ku Sendai Miyagi, 981-3206, JAPAN
Web site : www.mems-core.com Tel.: +81-22-777-8717

Company Policy

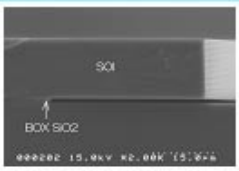
We support your development of new devices by our Q-TAT process.
We totally support from feasibility study to mass-production.
Our intimate relation with Universities and Laboratories helps us.

Core Technology

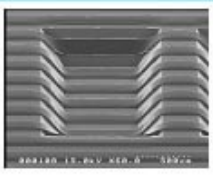

Deep RIE


stealth dicing


TSV

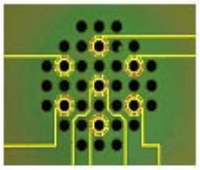


sacrificial layer etching

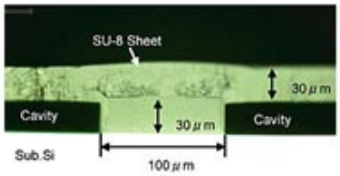

Dry film resist


Bonding


Wet etching


Metalization


Cantilever



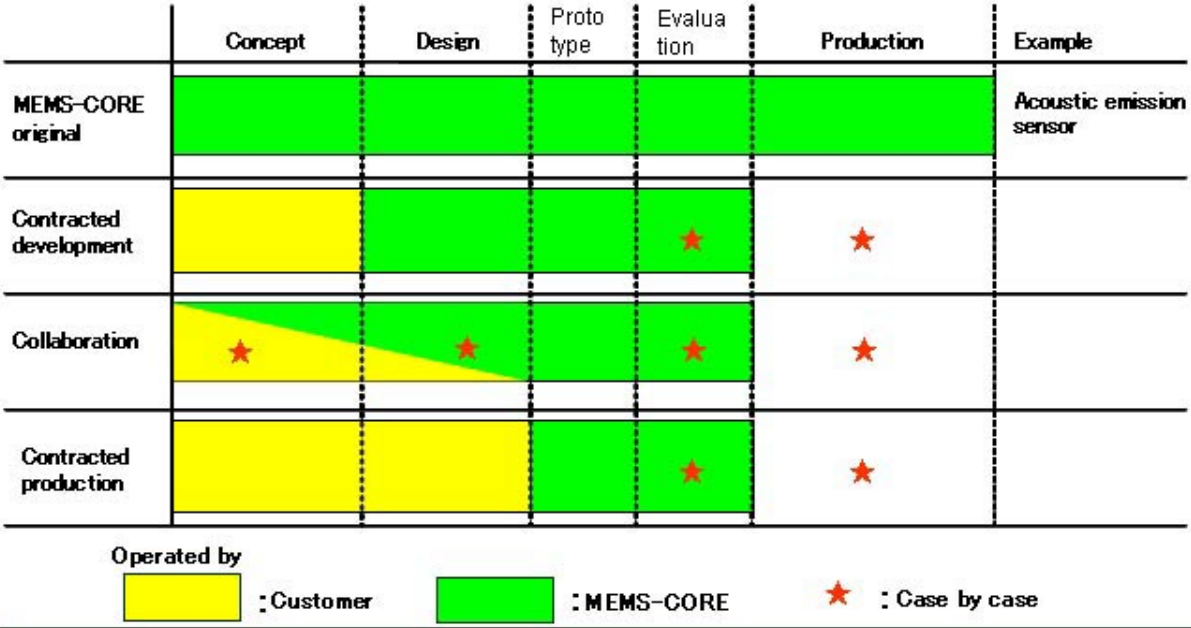
Laminating

5 MEMS CORE Co. Ltd (2)

Process Menu at MEMS-CORE

item	Process	Material/Equipment
Film deposition	Dielectrics (SiO_2, NSG, PSG)	Oxidation furnace, P-TEOS Atmospheric Pressure-CVD
	Metal (Au, Pt, Cr, Ti, Cu, W *et al*)	Sputtering, EB evaporation, Electro-plating
Photo-lithography	Resist Coat /Bake Exposure	Spin coater, Bake oven, Hot-plate Sus MA6, Double side aligner,
	Photomask making	CAD (CoventorWare™), Pattern generator
Etching	Dry etching (SiO_2, Si, Metals)	Deep RIE, RIE, Sacrificial Etching, XeF_2 Si etching Ion milling, O_2 plasma asher
	Wet etching	TMAH, HF-NH_4F, Metal wet etching
Bonding	Wafer bonding	Anodic bonding, Thermal bonding
Dicing Packaging	Wafer dicing	Blade dicer, Leaser dicer(Stealth)
	Die bonding, Wire bonding	Die bonder, Wire bonder
Polishing	Wafer polishing	Chemical mechanical polisher, Cleaner
Measurement Inspection		Measurement microscope, Leaser microscope, SEM, Stress monitor Sheet resistance, Surface profiler, Optical thickness measurement
Miscellaneous	Cleaning, Surface treatment	UV/O_3, HMDS

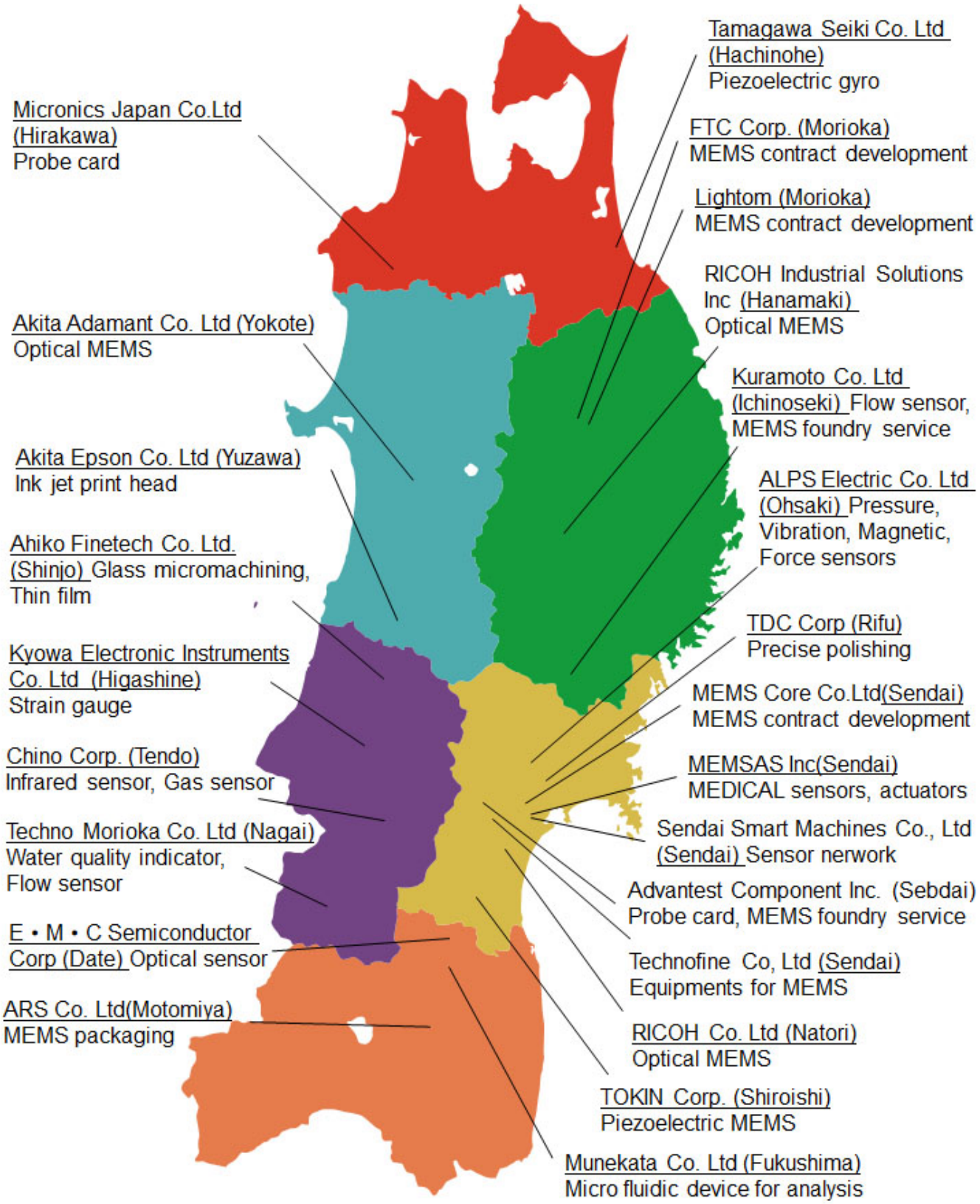
Foundry service/Collaboration scheme



MEMS-CORE Co. Ltd., e-mail; info@mems-core.com
URL: http://www.mems-core.com/ TEL: +81-22-777-8717 FAX+81-22-777-8718

6 MEMS company map in Tohoku region

MEMS company map in Tohoku region



MEMS
PARK CONSORTIUM

Advantest Laboratories Ltd.
Advantest Component Corp.
Advantest Technologies Co., Ltd.
Ahiko Finetec Co., Ltd.
ALPS ALPINE CO., LTD.
EV Group Japan KK
Ushio Inc.
SPP Technologies Co., Ltd.
Orbray Co., Ltd.
Koken Ltd.
Citizen Watch Co., Ltd,
SHIBAURA MECHATRONICS CORP.
SCHOTT Japan Corp.
Sumitomo Precision Products CO., LTD.
Tsuken Electric Ind. Co., Ltd.
TDC Corp.
TECNISCO, LTD.
Tokyo Electron Ltd.
TOKYO PHKA KOGYO CO., LTD.
TOKYO KEIKI INC.
Tohoku Economic Federation
NAITO SENSEI KOGYO CO., LTD.
Nagase & Co., Ltd.
Nabtesco Corp.
NAMICS CORP.
NIDEC COMPONENTS CORP.
Nippon Kayaku Co., Ltd.
Nippon Signal Company Ltd.
Nihon Dempa Kogyo Co., Ltd.
Niterra Co., Ltd.
PARKER CORP.
Panasonic Industry Co., Ltd.
Hamamatsu Photonics K.K.
Hitachi High-Tech Corp.
FUJI ELECTRIC CO., LTD.
Fujikura Kasei Co., Ltd.
HOKURIKU ELECTRIC INDUSTRY CO., LTD.
Mitsubishi Electric Corp.
Murata Manufacturing Co., Ltd.