# FUJITSU Fishtech<sup>®</sup>



## Profile

## Masayuki Takahashi

Mayor Kamoenai, Hokkaido

- In 1970, start working in a fishery field for a long time as a servant at the Kamuenai village office
- In March 2002 (H 14), elected as the mayor of Kameiuchi Village for the first time (Currently in 5th term)
- Kamienai Village seaweed forest∞ LAND Project
- ⇒Sea urchin aquaculture business(short-term) and sea cucumber multiplication business
- ⇒Land Aquaculture Demonstration Project for Sea

Urchins

- Hobbies (specialty) were swimming during student, baseball during staff member, and currently park golf.
- <u>A bustling beach once flourished for herring fishing...</u>



## Profile

## Hiroki Kunimura

Fujitsu Design Ltd. Service Integration Design Group Fishtech Development Leader & Designer

- Undergrad degree at the Department of Physical Engineering, Faculty of Engineering. Postgrad in product design, majoring in Art. Began career as UI designer after graduating.
- Computerized medical records  $\rightarrow$  data center  $\rightarrow$  cloud services  $\rightarrow$  GUI standardisation  $\rightarrow$ <u>Fishtech</u>
- Worked at Fujitsu headquarter for nine months in 2018.
- Fish lover. Avid fisherman.
- <u>I want to grow Japan's marine resources!</u>





## History of the Kamoenai Area

#### A historic village that prospered through herring fishing

- This village once had abundant herring stocks.
- It was an important port of call for cargo ships throughout the Edo and Meiji periods.
- The river is a famous salmon spawning ground. Plentiful natural resources.
- Kamoenai comes from the Ainu word "kamuinai," meaning "beautiful stream of the gods."







## Fukuroma in the Taisho period

- The largest fish capture in the prefecture in the first year of Taisho era.
- There was also "Yukaku" as entertainment for the Amimoto group
- \* Amimoto: A person who employs many fishermen

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Now it's the least populated village in Hokkaido (853 people as of June 30th, 2019)

- Firstly, the herring stocks dried up.
- In the Showa period, we also became unable to catch pollock, salmon, and trout, and the steamship fishing industry declined.
- Fishing in shallow waters to catch sea urchins, sea cucumbers, abalones etc. was an important part of the industry, but as sea desertification has progressed, the yield from this declined as well.
- The rough Sea of Japan isn't suited to coastal aquaculture.
- This is an issue faced by everyone along the Sea of Japan-facing coast of Hokkaido.



#### Sea urchins and sea cucumbers have more possibilities





- In nature, the seaweed that they eat has decreased due to sea desertification, and high-quality sea urchins are not being produced as much.
- Shortage/aging of sea urchin fishermen.
- Domestic and foreign tourism has increased, driving up demand for sea urchins.
- However, we are missing out on some opportunities due to the seasons and fishing
- <sup>7</sup> being affected by the climate.



- Since demand from China has increased with the growth of their economy, the price has multiplied 10x in 10 years! (¥7,000/kg)
- Pressure from overfishing and poaching has caused natural resources to decline
- Stocking of sea cucumbers has been carried out around the country, and we are working to preserve this resource, but there is a risk of resource depletion.

## The choice of aquaculture on land



#### With aquaculture in the ocean:

- ➤ It takes time to fix sea desertification in spite of improvement of rocky-shore denudation and natural environment project(Seaweed forest∞ LAND Project)
- It's difficult to farm fish in the rough Sea of Japan We could use the fishing harbor, but it would be limited in scale
- With an aging population/worker shortage, we wouldn't be able to manage the heavy labor of going out into the sea

#### With a closed system on land:

- The farm environment can be controlled, so production is stable
- We can manage feeding, disease, and bacteria, so <u>safe food is assured</u>
- We can predict planned production/shipping, so it's easier to industrialize
- <sup>8</sup> > We can create an <u>easy working environment for laborers</u>



# Fishtech® Aquaculture Management: Birth of the Kamoenai Version

#### A new aquaculture proposed by Fujitsu



# FUJITSU Fishtech®



Due to overfishing and environmental destruction, it is said that the Earth's marine resources have halved over the last 40 years, and people the world over are now taking another look at how we manage our oceans.

Fujitsu will use ICT technology to support all of our marine industry supply chains, and contribute to sustainable development.

SUSTAINABLE G ALS

## Fishtech® Aquaculture Management (prototype) FUjitsu

Prototype created after winning the company competition in 2018



Fujitsu Know-How

> Primary Industries ICT Akisai Know-How

Base Product: Marine Industry Solution Aquaculture System Performance Various Business Areas Industry Know-How

## Six Features

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Providing the perfect system combining many different technologies. The advanced design of the Aquaculture Management System.







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FUJITSU Fishtech



Fishtech

FUITSL





The only booth which introduced Aquaculture management using AI and IoT

EXCILITION OF





### Fishtech® Aquaculture Management



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## Construction started in Autumn 2018

Kamoenai, Hokkaido

## Aquaculture business

#### Fujitsu

 Construction/operation of the aquaculture management system

Coast Examination Engineering

- Aquaculture
- Use of the aquaculture management system
- Placement and operation of various sensors

## Fishtech® Aquaculture Management

#### A new aquaculture management system to revitalize towns

- Using AI/IoT to pursue better/more efficient aquaculture.
- Our meticulous design transcends the management role and creates new value to help revitalize towns.





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#### **Case:** Kamoenai, Hokkaido Fishtech Aquaculture Management

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#### Understand the tank status anytime, anywhere

The sensors and cameras interact in the IoT to enable real-time monitoring. It can be accessed from any device, including computers, smartphones, and tablets.



#### Support everyday aquaculture working

Our system supports everyday aquaculture work with features such as alert notifications and enabling input of shipping/feeding times.

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- Store data on the cloud environment
- Store IoT/business data on the cloud environment.
- Pursuing more advanced and efficient aquaculture.
- We are planning to add AI feature in future.

#### **Content that can revitalize town** In addition to management, it acts as a PR resource for producers.

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Aquaculture tank



**Cloud Service** 



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## Digital Learning Fisdom Fisher Education in Indonesia



## Digital Learning Fisdom A remote education system that helps nurture human resources in fishing villages



#### Digital Leaning Fisdom



## SATREPS

## Participation in SATREPS, the international joint research project

Bringing fish farming and fishing to a higher level leads to the revitalization of the economic cycle for fishing villages. The objective is to provide residents with opportunities for higher education and the freedom to select their career and resolve disparities by reducing poverty. Through Digital Learning Fisdom, we provide the knowledge that supports fishing villages in Indonesia.

#### SATREPS, the international joint research project

An international science and technology cooperation program for global issues carried out in conjunction by the Japan Science and Technology Agency (JST) and the Japan International Cooperation Agency (JICA).

#### Institutions participating in the joint research project

Future University Hakodate, Tokyo University of Agriculture, Hachinohe National College of Technology, Toyohashi University of Technology, Upside LLC, New Media Development Association, Fujitsu Ltd.

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#### Digital Learning Fisdom

THE ORIENTATION SEMINAR FOR THE ONLINE EDUCATION SYSTEM ON SEAWEED AQUACULTURE Metaram, 11-12 March 2018

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#### **Orientation for Local Residents**

We travel to various parts of Indonesia, invite local fishers, and lecture them using Digital Learning Fisdom.

#### Digital Learning Fisdom

















## High-quality Educational Content

Using sequential video content, fishers learn techniques and points to pay attention.

#### Digital Learning Fisdom





02. Memerlukan waktu dan tenaga untuk penyiapan



#### ibandingkan pelet

#### **Testing and Certification**

There is a review test after finishing the video content. The certificate is given if you pass.



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## The World from Now On

## Introduce ICT Farming to Make the Fishing Industry Sustainable



Over the past 30 years, Japan's fish capture have decreased to only 1/3! A lack of catches leads to a lack of revenue. All regions are heading toward decline, but…



Simultaneously revitalize regions and food production issues through ICT aquaculture

# (Fisheries Agency) Turning fish farming into a growth industry…land farms facilities



 $_{\scriptscriptstyle 33}$  Excerpt from the Fisheries Agency's "2019 Budget for Core Fish Farm Facilities and Businesses

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Regional trading company sponsored by Kamoenai: Develop exit strategies for product planning, sales, and branding

## Kamoenai in 5 years…



- Establish new supply chains ranging from production /processing to sales
- Aim for ¥500 million in sales! (Roughly 1.5 million sea urchins at ¥300 a piece)
- Increase earning power through existing fishing operations and land fish farms. Increase earnings of fishers by 10%
- Kamoenai is the leader in land farms for sea urchins
- High-level education of technicians (fishing ground environment, resource management, increased farms, processing, distribution, exchange)
- Scoping overseas expansion with the popularization of Japanese food
- It is important for children to urge this job!



## The Mission for Fishtech Fish Farm Management



- Create a framework to efficiently ship 1.5 million sea urchins
   The basket system has quite a lot of items to manage. Could link it to processing.
- Develop know-how to make "delicious sea urchins"
   Pursue the flavor of sea urchins using data. What is it best to do and when?
- Allow fishing and farming to coexist
   The village's resources are the foreshore and the water tank.
- Local production and consumption of energy
   Optimize the village's energy. Put energy management into practice.

#### Surpass the ordinary thinking through innovative design. Draw the future of fish farms with Fishtech!

## Conclusion (Takahashi)



- A "major challenge" because of "Small fishing village"
- The key point for success is local enthusiasm. Kamoenai is great!
- We want more people to know about delicious sea urchins
- In addition to sea urchins, education is also valuable
  - ESD = As a place of marine education
- Our mission is to leave and increase fishery resources for future generations

## Conclusion (Kunimura)



- ICT in fishing is a powerful growth industry.
- The decline of Japanese fishing resources has been relentless (1/3 the catch in the past 30 years)
- Using technology, we can resolve heavy social issues! The role of adults is to create things and frameworks for resolution.
- Using the abilities I have cultivated, I can help the world. There is nothing better. Difficult situations are opportunities.
- We look forward to working with you again.

# FUJITSU

shaping tomorrow with you



# "海のみえる化" ICTブイソリューションのご紹介

## "Visualizing the Ocean" Introduction to the ICT Buoy Solution





## 「ICTブイ」は水温や塩分センサーなどを実装し、海洋データをドコモのネットワークを経由して、スマートフォンで手軽に確認できるソリューションです。

This solution equips an ICT Buoy with water temperature and salt sensors as well as other equipment that collect ocean data that can be easily checked via the DoCoMo network using a smartphone.









全国の漁業協同組合さまおよび企業さまに導入されています。

Used by fishery cooperatives and companies throughout Japan.



#### 魚種拡大中!!

The number of fish species being covered is being expanded.

## 他サービスとの連携 Collaboration with Other Services





Chl.a分布図 Chl.a distribution charts







#### 産学連携で海苔養殖の課題解決!

#### 広島大学とドコモが栄養塩推定モデルに関する共同研究

Collaboration between industry and academia solved the seaweed (nori) cultivation problem! Hiroshima University and DoCoMo conduct joint research on a nutrient estimation model

1.研究題目 2.研究目的 3.研究内容	栄養塩推定モデルの開発 安価なセンサーで計測したデータを説明変数とした栄養塩推定モデルを開発 水温、塩分、植物プランクトン量データを解析することにより、栄養塩推定モデルを開発する。 解析においては、岡山県農林水産総合センター水産研究所が提供するデータ、岡山県漁業協 同組合連合会の協力のもと ICT ブイで計測したデータを用いる。	ウミミル         (アンデックス㈱) 提供)         (アンデックトン量に加えて、栄養塩推定)
4.実施期間	2018年10月 ~ 2019年3月	
5.実施場所	<ul> <li>(1)研究実施場所</li> <li>国立大学法人広島大学内広島県東広島市鏡山一丁目3番2号</li> <li>(2)実証フィールド</li> <li>岡山県海域の海苔養殖場等</li> <li>①西部海域(1点)</li> <li>②中部海域(児島湾沖)(2点)</li> <li>③東部海域(1点)</li> </ul>	
6.役割分担	<ul> <li>(1)広島大学の役割 : 栄養塩推定モデルの開発</li> <li>(2)ドコモの役割 : ICT ブイによるデータの収集、 スマートフォンアプリへの栄養塩推定値情報の配信</li> </ul>	



Providing high added value and future deployment



東京サステナブルシーフード・シンポジウム

# 小浜市「鯖、復活」養殖効率化 プロジェクト **Obama City** "Mackerel Revitalization" **Aquaculture Optimization** Project

小浜市 産業部 農林水産課 食・地域創生戦略室 畑中 直樹 KDDI株式会社 ビジネスIoT推進本部 地方創生支援室 石黒 智誠



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# **鯖養殖現場へのIoT導入** Implementing IoT at Mackerel Aquaculture

福井県小浜市の鯖養殖現場において IoTを漁業に活用した 「『鯖、復活』養殖効率化プロジェクト」を開始 (2017年11月より) The "'Mackerel Revitalization' Fishery Optimization Project," in which IoT is utilized in the fishing industry, began in a mackerel aquaculture in Obama, Fukui (November 2017)



# ○鯖養殖の事業採算性を確保するためには、海面の環境を把握し、効率的な給餌を行うとともに、生残率を高める必要がある。

In order to ensure the profitability of mackerel fisheries, there is a need to understand the environment of the sea surface, carry out efficient feeding, and improve survival rates.

## ○海面環境と給餌の関係は、漁師の経験と勘に頼られており、 明確な養殖技術が確立されていない。

The relationship between the environment of the sea surface and feeding relies on the experience and instinct of fishers, and accurate farming techniques have not been established.

## ○水温と給餌量の関係を明確化(水温、酸素濃度、塩分)

Clarify the relationship between water temperature and amount to feed (water temperature, oxygen concentration, salinity)

## ○ 飼育方法のマニュアル化(給餌計画、給餌記録など)

Create a manual for feeding (feeding plan, records, etc.)

## 対策 Countermeasures

※ 総務省 平成29年度地域 I o T 実装推進事業として採択 環境測定 遠隔検知 1時間に1回計測・ サーバーへ送信 塩分 サーバー |給餌(実施と記録)| 184 38 278 43 1018年 1月 27日 小田市 4550 ....... 9021 給餌量を記録 環境変化・給餌記録を確認 Lotas 74 Dillion 372.me

> 勘や経験の見える化→データに基づく根拠ある判断へ 体感やノウハウ→振り返りが可能なデジタルデータへ Visualize instinct and experience→Decisions based on data Sensations and know-how→Digital data that can be reviewed

## 対策 Countermeasures

IoTセンサー IoT Sensors 環境の自動測定 船を出さずに状況把握 Automatically measure the environment to know conditions without sending out boats



**Digitalized daily reports** (Feeding manual)



## これまでの養殖 Past Farming 勘や経験を用いて 手帳を見ながら餌やり

Use instinct and experience to feed while reading notebooks



## IoT/データを 駆使した給餌管理 Feed management using IoT/data





#### コスト(人件費/燃料費)を 削減! 漁業への就労機会の拡大を支援! Reduce (human and fuel) costs! Support the increase of fishing jobs!

## 目指す姿 Our Aim

#### 小浜が誇る「食」 "Food" that is the Pride of Obama ~生産者が誇りをもってつくる食はA級であり永久に残さなければならない~(A級グルメ構想)

Level-A gourmet created with the pride of producers that must be passed on forever

### ~小浜ならではの食を研く~ ~Refining Food that is Unique to Obama~

京都まで

19分

新大阪まで **38**分 調理する料理人が小浜ならではの食材を知る



#### ~小浜ならではの「食」を楽しめる場を整備~ 北陸新幹線が京都・関西につながるころには小浜に「食」で人を呼び込む

 $\sim$ Establishing a site where visitors can enjoy "food" unique to Obama $\sim$ 

Drawing visitors to Obama for "food" by the time the Hokuriku Shinkansen is extended to Kyoto and the Kansai region

小浜ならではの食を提供



## 食で人を呼び込み「食」の根幹を担う一次産業の活性化を図る!

We aim to draw visitors to Obama with food and revitalize the primary industry that is fundamental to our food!



Linnana and

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### Tomorrow, Together

