

ハンブルグ港での船舶からの 大気汚染の計測事例



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Kii株式会社

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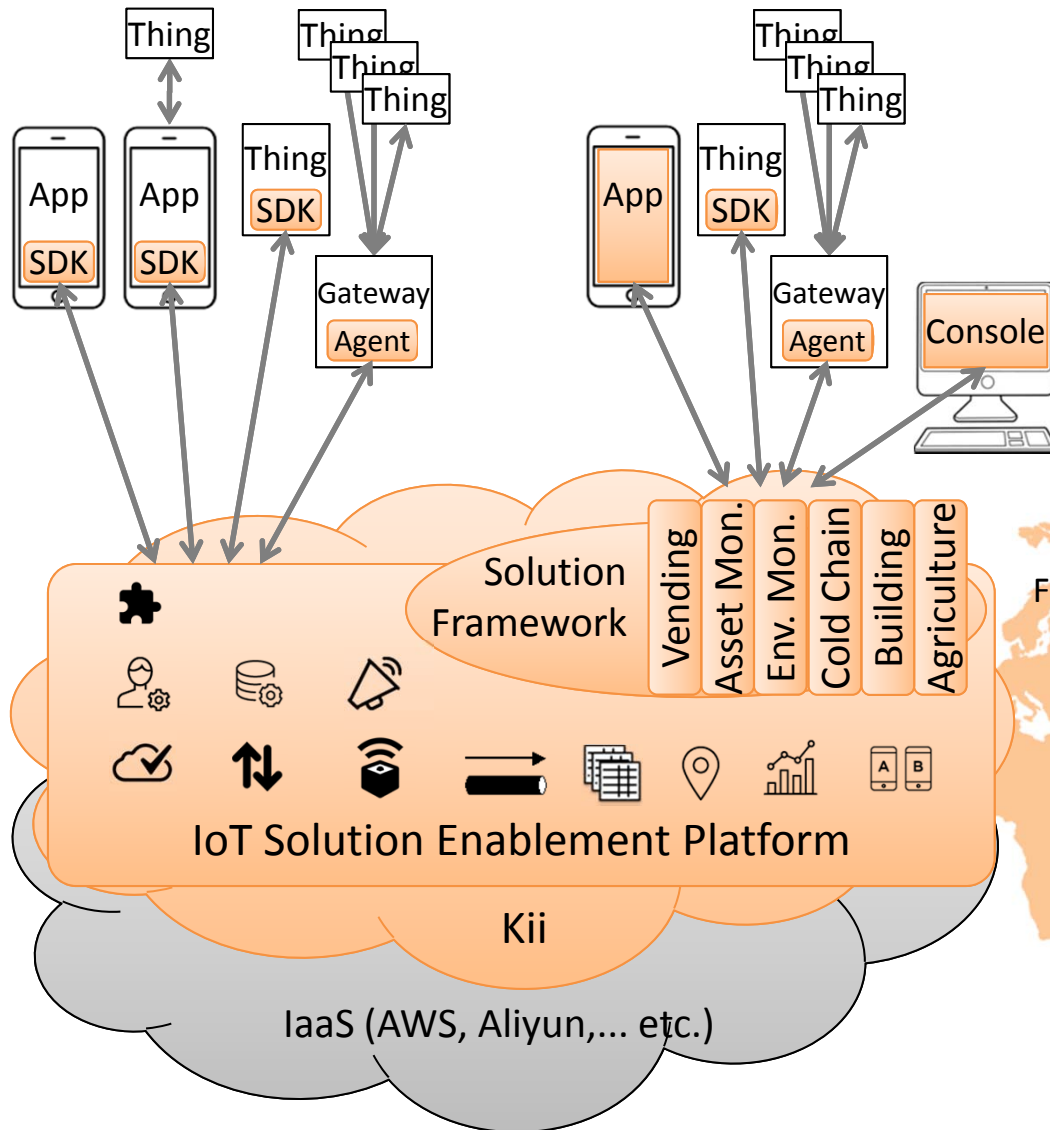


Kiiとはどんな会社？

IoT Solutions & Enablement Platform

プラットフォーム利用

ソリューション利用



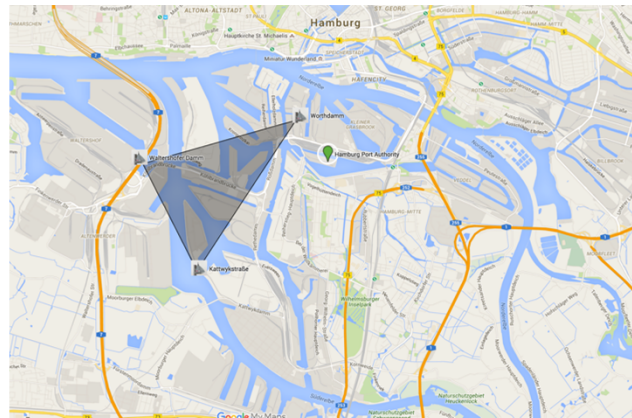
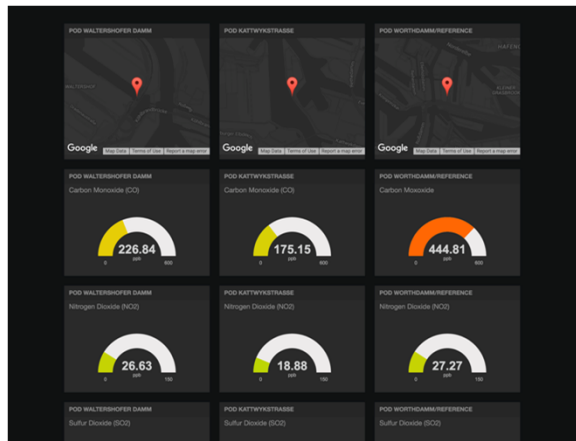
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- IoTソリューションを支えるプラットフォーム
- プラットフォームの柔軟性を活かしたソリューション
- プラットフォームとソリューションを開発運用しながら日本発でグローバル展開している日本企業

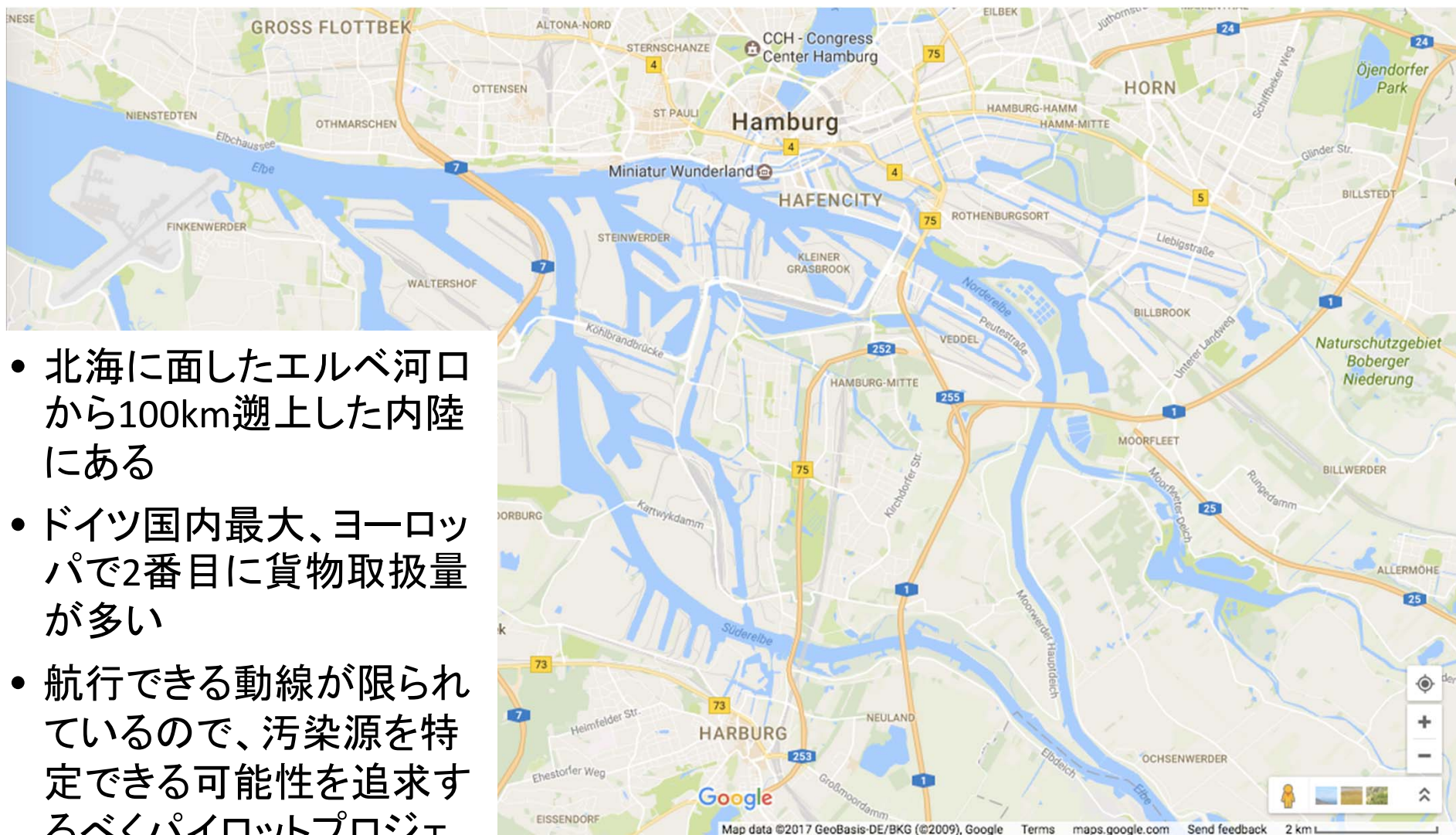


- ★ 共用環境 & 専用環境
- ★ 専用環境

ドイツ ハンブルグ港での 環境汚染源特定プロジェクト



ハンブルグ港



- 北海に面したエルベ河口から100km遡上した内陸にある
- ドイツ国内最大、ヨーロッパで2番目に貨物取扱量が多い
- 航行できる動線が限られているので、汚染源を特定できる可能性を追求すべくパイロットプロジェクトを2016年3月に開始

センサー機器選定

- センサー機器の要件
 1. ある程度の測定精度
 - a. 基準となる値と必ずしも同一の値を示す必要はないが、ある程度近い値を示す精度が必要
 2. 感度が高く検出限界が低いこと
 - a. 屋外での汚染源特定
 - b. 道路際での対車両と違い、水際から距離のあるところを航行する汚染源を特定
 3. 場所をとらず、電池駆動が理想
(街灯から電気をもらおうとしたら昼間オフだった)
 4. そして妥当な価格!!!

参照基準



- 精度が高いが高価なセンサー設備。この設備を当該目的には使わない。
- この設備が示す値と比較することにより、センサー機器の精度を判定。

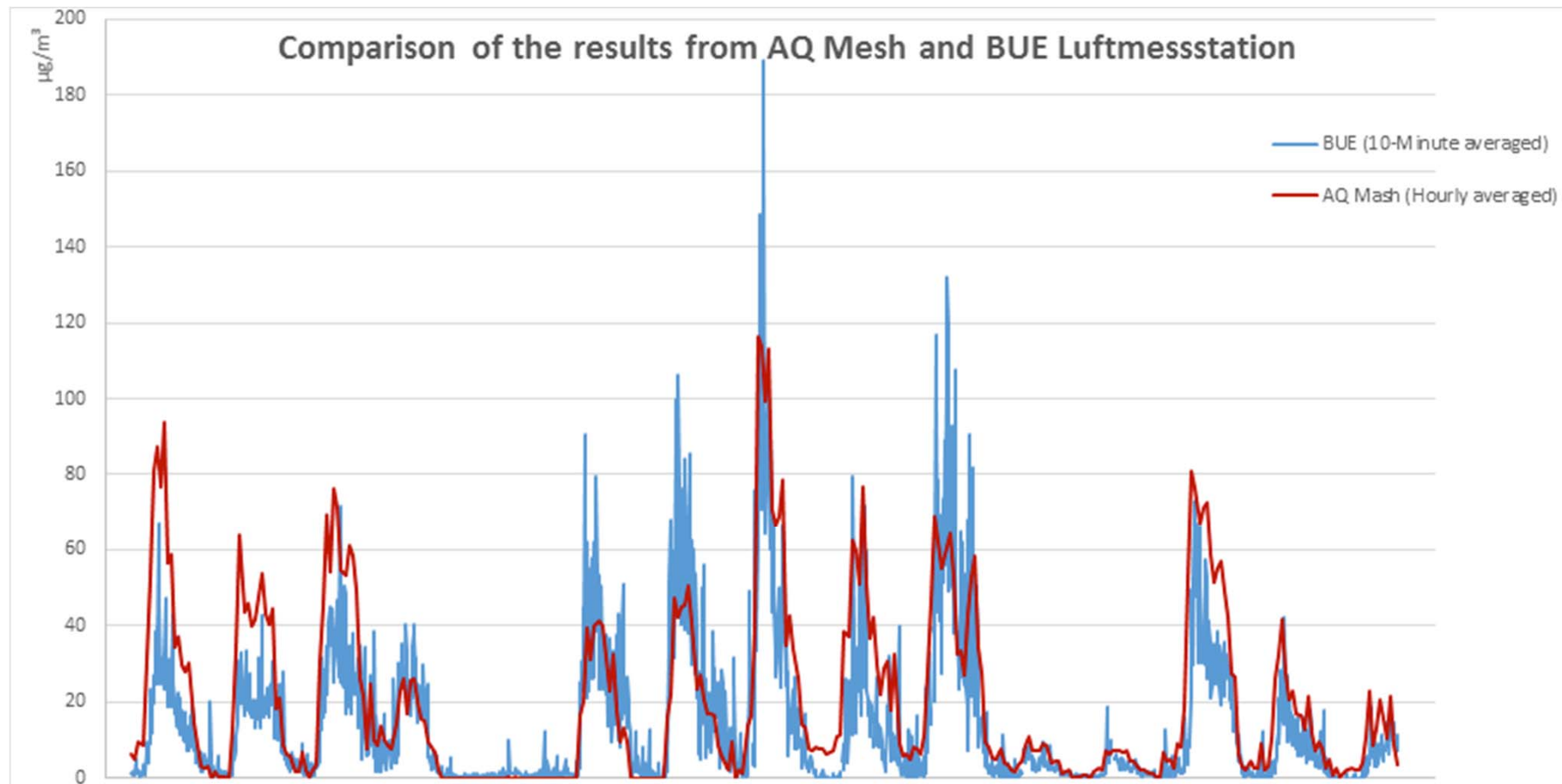
選択したセンサー機器



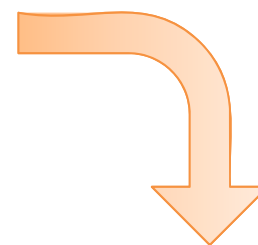
- AQMesh
 - 以下物質の検出限界が 5~10 ppb
NO, NO₂, CO, O₃, SO₂

Parameter	Units of measurement	Range
NO	ppb or $\mu\text{g}/\text{m}^3$	0 to 4,000 ppb
NO ₂	ppb or $\mu\text{g}/\text{m}^3$	0 to 4,000 ppb
NO _x	ppb or $\mu\text{g}/\text{m}^3$	0 to 8,000 ppb
O ₃	ppb or $\mu\text{g}/\text{m}^3$	0 to 1,800 ppb
CO	ppb or $\mu\text{g}/\text{m}^3$	0 to 6,000 ppb
SO ₂	ppb or $\mu\text{g}/\text{m}^3$	0 to 10,000 ppb
Pod temperature	°C	-20 to 100 °C
Pressure	mb	500 to 1500 mb
Humidity	%	0 to 100 %RH
Particle count	Particles/cm ³	0.3 – 30 μm
PM 1	$\mu\text{g}/\text{m}^3$	0 – 200 $\mu\text{g}/\text{m}^3$
PM 2.5	$\mu\text{g}/\text{m}^3$	0 – 500 $\mu\text{g}/\text{m}^3$
PM 10	$\mu\text{g}/\text{m}^3$	0 – 1,000 $\mu\text{g}/\text{m}^3$

基準値との比較



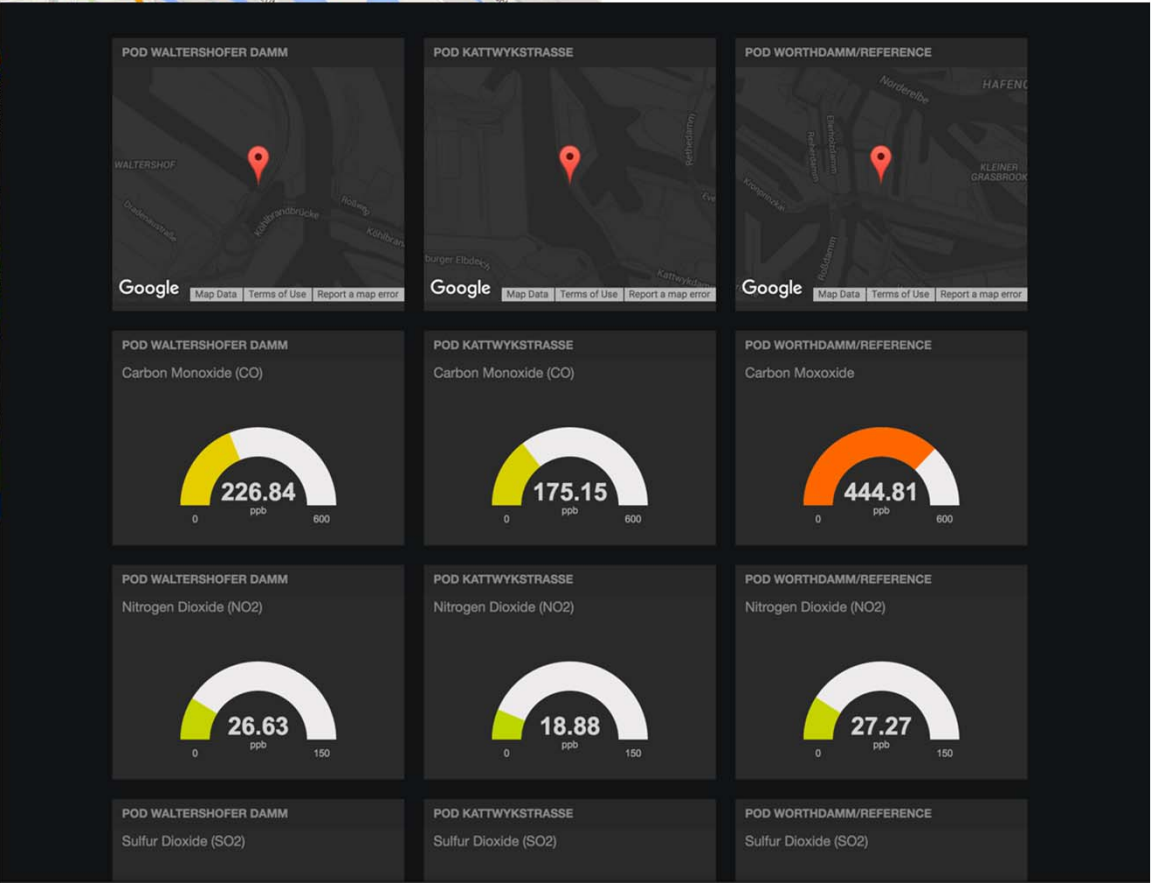
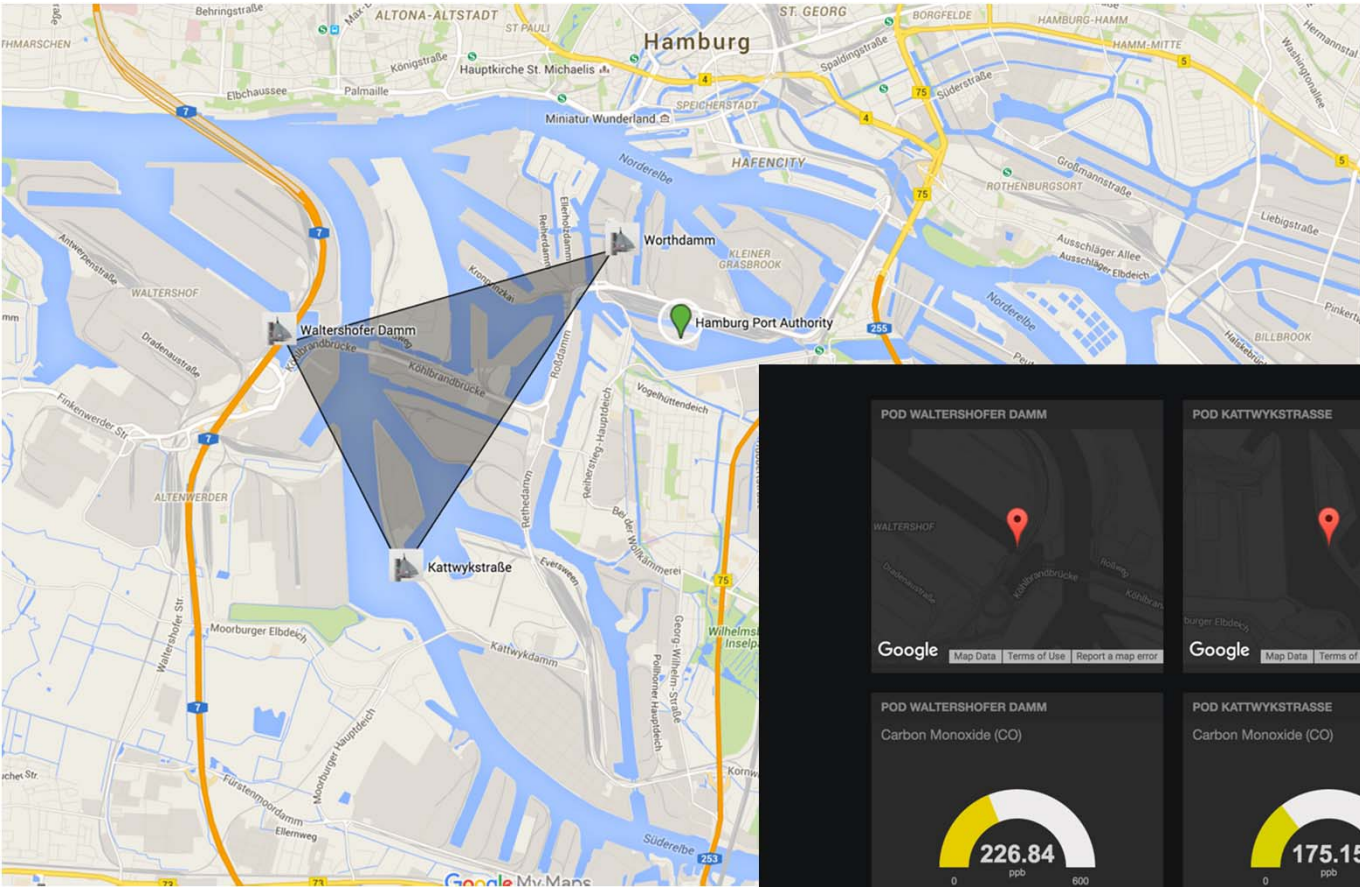
センサー機器の設置



こんなに小さく
なりました



場所の選定



Emission Value Analysis via Cloud

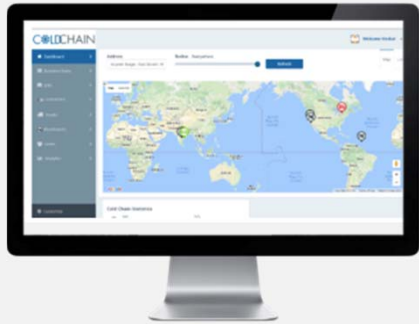
"The IoT pilot project has been very successful for us," summarizes Ulrich Baldauf, Head of IT Strategy at HPA. "We have been able to measure numerous parameters of air pollution live, e.g. the emission of particulate matter of particle size PM2.5 and PM10, or, in some cases, even nitrogen dioxides, which generally account for only 10 billionths of the total air. The Kii platform enabled us to collect the various data sources in a uniform manner and to prepare them for analysis."

"With this IoT pilot project, not only have we shown that we can implement complex projects in a timely and affordable manner, but also that there is a potential for real-time emission measurement for the port of Hamburg," explains Martin Tantow, Kii General Manager, EMEA. "Our IoT solution allowed us to install the sensors at critical points of the shipping and road network, to provide real-time visibility, and to prepare them for analysis. In Hamburg, Kii has demonstrated how effectively ports and cities can monitor air pollution through IoT."

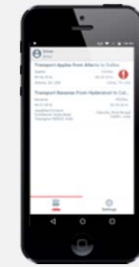
閑話休題

Kiiはこんなものも作っています

Kii Cold Chain Monitoring Solution



Cold Chain Portal



Driver App



Containers



Warehouses



Trucks

Kii Cold Chain Portal

The screenshot displays the Kii Cold Chain Portal interface. On the left is a navigation sidebar with menu items: Dashboard, Jobs, Tasks, Business Rules, Containers, Trucks, Warehouses, Users, and Analytics. The main content area shows a table of job entries. At the top right of the main area, there is a 'Welcome phani' message and a search bar. Below the search bar, there is a 'Show 10 entries' dropdown and an 'Add +' button. The table has columns for Status, Job Name, Quantity, Created At, Dates (Start, End), Temperature (Min, Max), Progress, and Action. Three entries are visible:

Status	Job Name	Quantity	Created At	Dates		Temperature		Progress	Action
				Start	End	Min	Max		
	Transport Vaccines from Hyderabad to delhi	3000 lbs	2016-09-27 07:15:51	09-28-2016	09-30-2016	35 °F	46 °F	pending	
	Transport Apples from Atlanta to Dallas	1000 lbs	2016-09-26 09:40:30	09-26-2016	09-28-2016	62 °F	70 °F	exception	
	Transport Bananas From Hyderabad to Calcutta	4000 lbs	2016-09-26 08:01:23	09-27-2016	09-29-2016	62 °F	70 °F	completed	

At the bottom of the table, it says 'Showing 1 to 3 of 3 entries' and 'Previous 1 Next'. The footer of the page contains '© 2016 Kii. All Rights Reserved.' and 'Customize' buttons.

Create and manage Jobs to transport products from source to destination, shipped in temperature controlled Containers via Trucks

- Jobs with temperature control issues show up as Tasks both in the Portal as well as in the Driver app
- Tasks will direct driver to move the containers to nearby Warehouses as needed, plus will update asset metadata with information like abnormal temperature duration

Kii Cold Chain Portal

Business Rules
Temperature Rules

Build & Deploy

TemperatureRules.gdst - Guided Decision Tables

Editor Overview Source Data Objects

All the rules inherit: None selected

Decision table

#	Des	Product Type	Temperature (max [°F])	Temperature (min [°F])	Alert
1		Produce		62	Too Cold
2		Produce	62	70	Normal
3		Produce	70		Too Warm
4		Medicines		35	Too Cold
5		Medicines	35	46	Normal
6		Medicines	46		Too Warm
7		Dairy and Eggs		28	Too Cold
8		Dairy and Eggs	28	34	Normal
9		Dairy and Eggs	34		Too Warm

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Create and manage **Business Rules** for cold chain, like Temperature Rules, Warehouse Allocation Rules etc. as well as Product Rules (like for vegetables, eggs, vaccines etc.)

- Different stakeholders involved in the overall solution can define rules for different aspects