



AI Migratory Bird Habitat Restoration Project

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Chunghwa Telecom (CHT) is actively pursuing its *Sustainability and Digital Dual Transformation* strategy, integrating cutting-edge ICT and AIoT technologies to become an ESG-driven green enterprise.

The **AI Migratory Bird Habitat Restoration Project** leverages image recognition, sensor networks, and real-time communication systems to monitor ecological and aquatic environments. The platform provides visualized dashboards for data-driven decision-making, enhancing the efficiency and effectiveness of environmental monitoring and conservation efforts.

The project has been successfully implemented in Tainan, Taiwan, with a focus on **black-faced spoonbill conservation, avian ecology monitoring, and water resource management**, demonstrating the potential of AIoT technology in supporting sustainable biodiversity and ecological restoration initiatives.





Association Partnership Model

- Collaborate with local wildlife and bird conservation associations via partner networks.
- Match organizations interested in ecological monitoring or restoration projects.
- Develop joint demonstration sites, data-sharing initiatives, and international collaboration opportunities.



Local Enterprise Partnership Model

- Invite ESG-oriented or sustainability-focused enterprises to participate via sponsorship.
- Facilitate enterprise engagement with local associations and communities to advance ecological restoration and sustainable development.

A、AI Migratory Bird Habitat Restoration Project- Project Overview

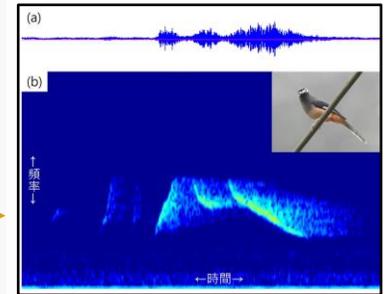
1. AI Ecological Education/Smart School



4. 3D water level/water quality monitoring



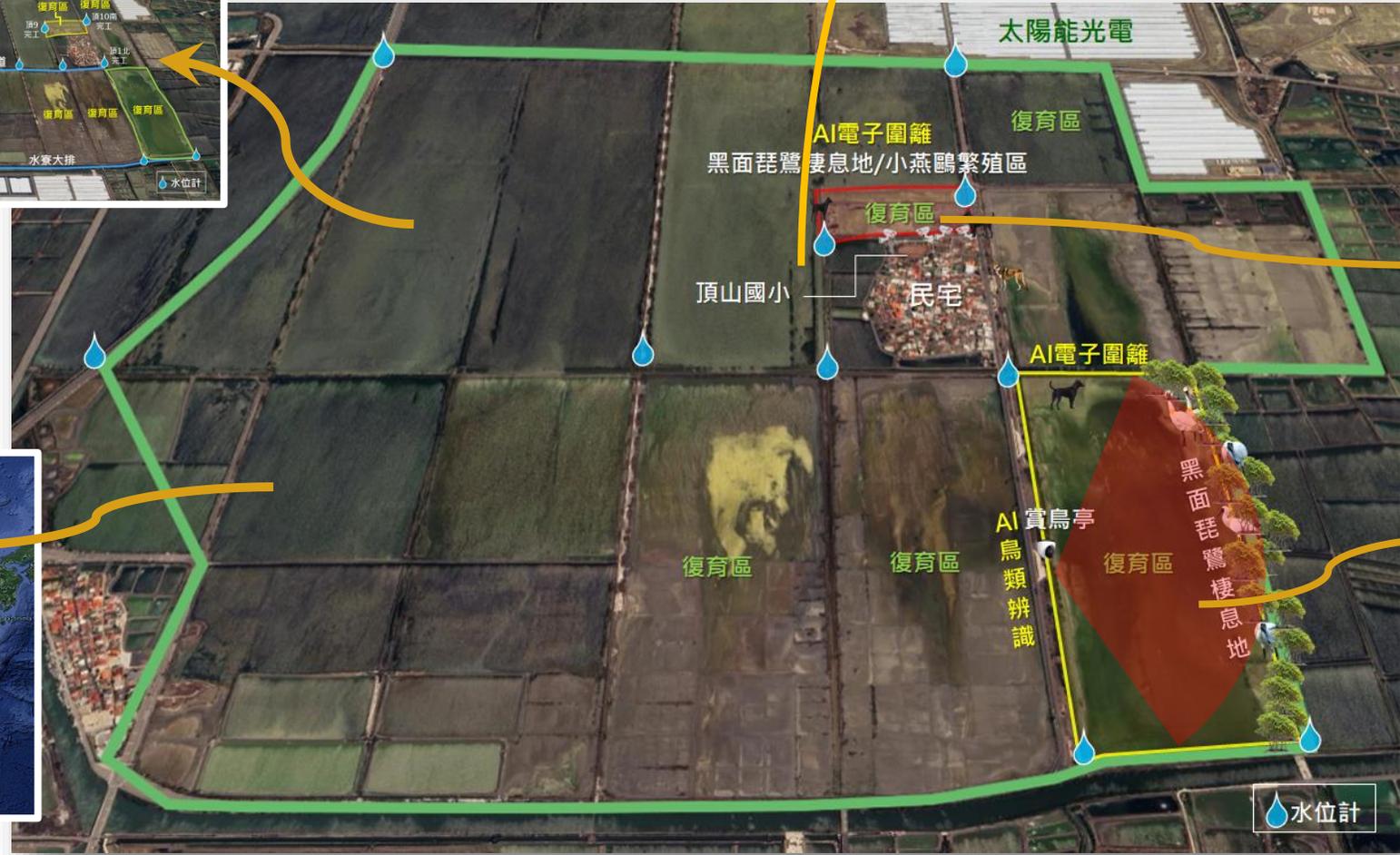
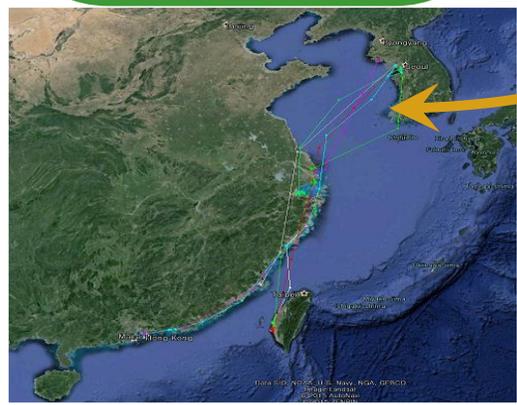
2. AI sound identification of bird species



3. Expanding AI identification of migratory birds



5. path tracing



B、Execution plan- 1. AI Ecological Education School

1.1 AI Ecological Education Center

- Dashboard : Platform achievement resource sharing
- Little Tern Diary : Little Tern nesting area identification and behavior diary
- AI Identifying bird species by sound : Listen to the sounds of nature by looking at
- AI Bird species identification : Expanding AI identification of migratory birds for conservation



B、Execution plan- 2. AI sound identification of bird species

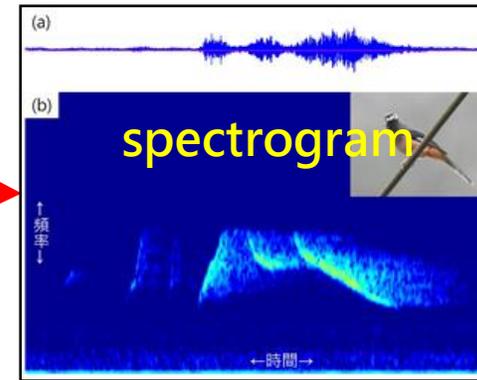
2-1. AI Identify species by sound (SILIC)

「AI identifies bird species by **listening** to their **sounds**」 Interpret the sounds of nature

- **SILIC, Sound Identification and Labeling Intelligence for Creatures** : By setting up automatic recorders in the wild, the species, time and number of migratory birds can be analyzed from the recordings.



2. SILIC



Audio files obtained from the Little Tern Restoration Area were input into SILIC to generate a "spectrogram."

2-2. Sound-driven Design : UI/UX Listen to the sounds of nature by looking at

3. UI/UX

- Migratory bird species
- Spectrum
- Location
- Time
- Number



Analyze the source of the sound using open source (SILIC) to find the species, time, and number of migratory birds

<https://silic.tbn.org.tw/>

GitHub Source code, species/sound lists

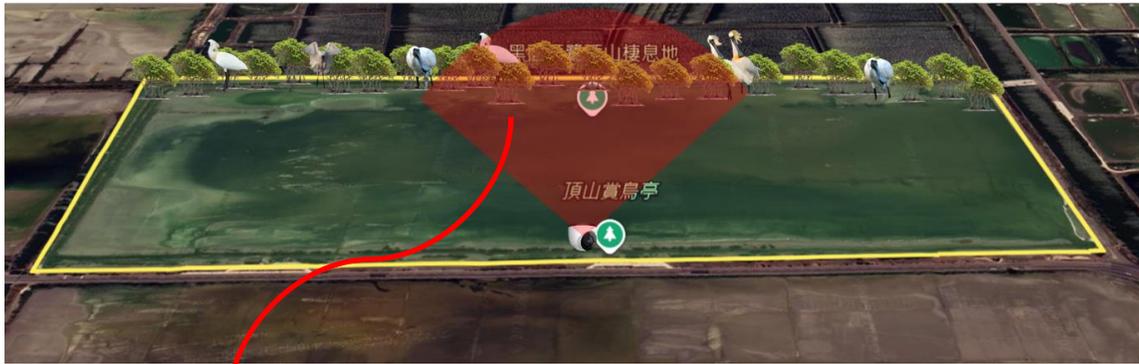


B、Execution plan- 3. AI Migratory bird identification upgraded

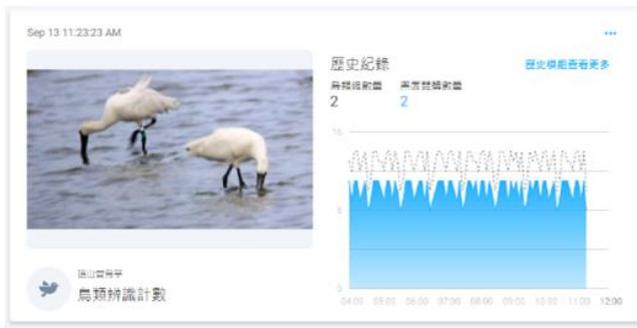
「AI can identify bird species by **looking at pictures**」 Expand bird species identification

Expand AI identification of more than 10 protected migratory bird species

- Key points of the problem to be solved : The dome camera only captures the number of **birds and black-faced spoonbills** within the frame. ◦



3-3. Optimize identification : bounding box、Light brightness



3-1. Expand identification of 10 bird species :

- | | |
|-------------------------|--------------------------|
| ① Platalea minor | ⑥ Recurvirostra avosetta |
| ② Ardea cinerea | ⑦ Himantopus |
| ③ Ardea alba | ⑧ Spatula clypeata |
| ④ Egretta garzetta | ⑨ Mareca Penelope |
| ⑤ Nycticorax nycticorax | ⑩ Anas acuta |

3-2. Identify 5 bird species at the Sternula albifrons' habitat :

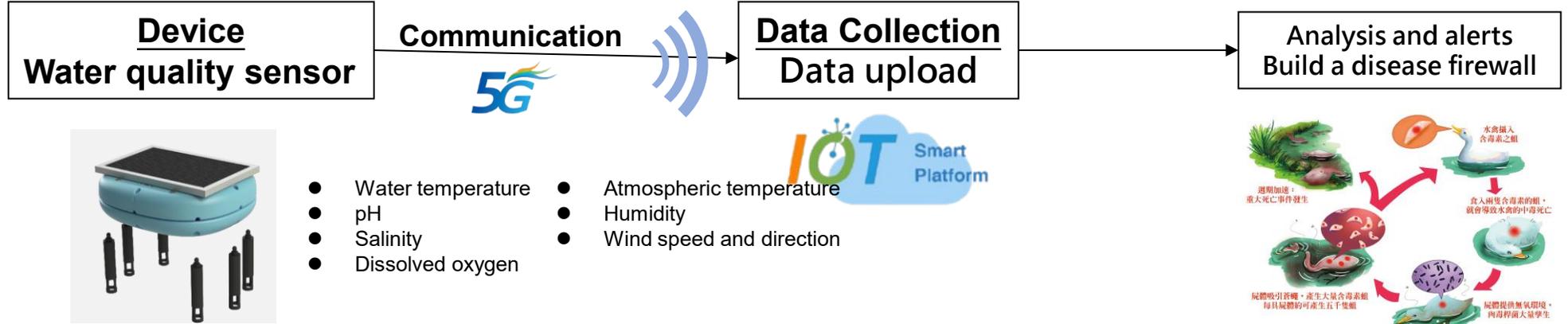
- ① Sternula albifrons
- ② Glareola maldivarum
- ③ Himantopus Himantopus
- ④ Charadrius alexandrinus
- ⑤ Recurvirostra avosetta



B · Execution plan- 4. Habitat Protection - 3D water level and water quality monitoring

Habitat monitoring and management to mitigate threats, prevention is better than cure

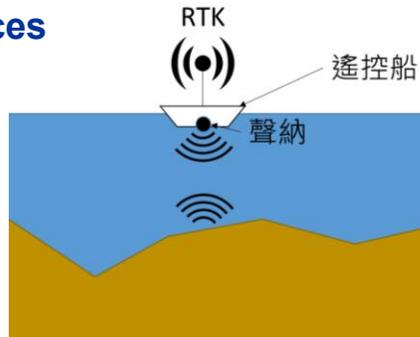
4-1. AIOT Smart water quality monitoring builds a disease firewall



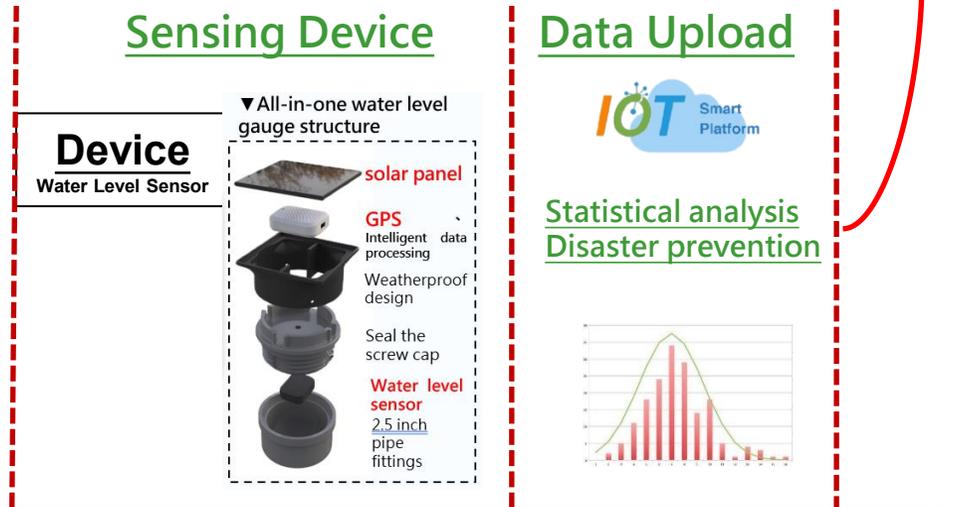
Threat Mitigation

- Botulism
- Avian influenza
- Water pollution
- Climate change
- Drought and flooding

4-2. 3D water level monitoring in habitat spaces

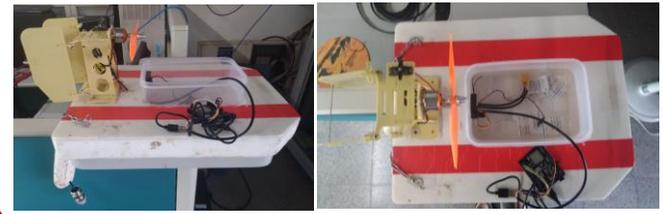


4-3. AIOT Water Level Meter Flood and drought warning and analysis



Solution

Solution1. control boat+GPS



Solution2. Splash Drone 4

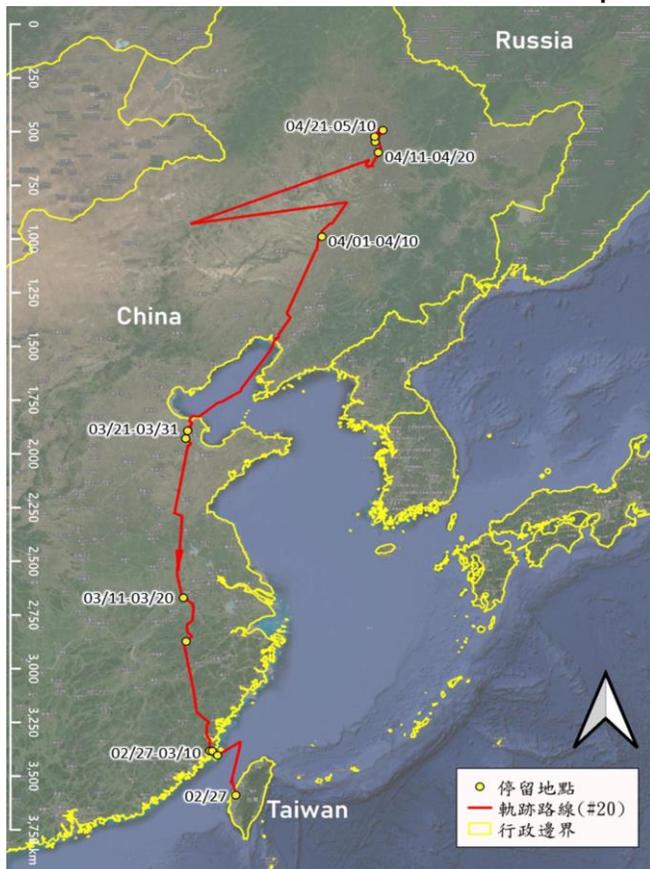


B、Execution plan- 5. Path Tracing

AIoT Path tracking to avoid potential threats

The Black-faced Spoonbill's habitat is an indicator of sustainable development and reflects changes in the environment on which humans depend.

- During migration, **black-faced spoonbills optimize for suitable environmental conditions** (such as wind speed and direction) and choose paths that reduce energy consumption and risk.



Taiwan Druid



- 68 × 21 × 50.5 (mm) · 27±0.3g °
- 210mAh+6 solar panel °
- IP 68
- 4G+(GNSS、Environment、ODBA、Beacon) °

Ornitela

<https://www.ornitela.com/>



- **Size:** weights 50 grams, dimensions 76×38×24 mm
- **Data storage:** 128 MB capable of storing nearly 2,000,000 records
- **Data upload:** via GSM/GPRS/4G network
- **Lithium-Polymer battery + Solar:** Fully charged battery is sufficient for logging 5,000 positions.

Lotek

<https://www.lotek.com/>



- **GSM Network:** 5G
- **Weight:** 55g
- **Size:** 79 x 49 x 38 mm
- **Solar panel :** 1056 sq mm
- **Cell size:** 950 mAh

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T H A N K Y O U



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