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*IAHR Global Water Security Webinar  
10 September 2020*



# The Business of Global Water Security: Linking Knowledge to Practice

Introduction by

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International Association  
for Hydro-Environment  
Engineering and Research

Supported by  
Spain Water and IWHR, China

*IAHR Webinar on “The Business of Global Water Security:  
Linking Knowledge to Practice”  
10 September 2020*

## International Panel Discussion

(Chair: Joseph H W Lee)

### Presentations by Distinguished Panelists

- **Mark Fletcher**, Director, ARUP (UK) Ltd  
**Understanding water resilience at scale**
- **Roger Falconer**, FEng, CAE, Cardiff University, UK  
**Global water security – hydro-epidemiological studies**
- **Jaap Kwadijk**, Deltares, Netherlands  
**Water security is indeed a global issue**
- **Arthur Mynett**, IHE Delft, Netherlands  
**Nature-based solutions for water security – a business opportunity –**
- **Jianyun Zhang**, FEng, CAE, Nanjing Hydraulic Research Institute  
**Water security in china: problems, pathways and practices**
- **Tomás Ángel Sancho Marco**, Spanish Ministry for Ecological Transition  
**Managing flood and droughts: engineering contribution**
- **Discussion**



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**IAHR** is the oldest international association engaged in water engineering and research - founded in 1935 by the world's leading hydraulic research institutes

## Beijing

China Institute for Water  
Resources and Hydropower  
Research (IWHR)



## Madrid

CEDEX-CEH and Spain Water

(public initiative, including CEDEX, the  
Directorate General for Water and the  
General Directorate of Sustainability of the  
Coast and the Sea)



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# IAHR is a global professional association

## Our Vision is to:

Bring together the world's Hydro-Environment experts, researchers and engineers to accelerate solutions and knowledge discovery for a better water future for all

## Our Mission is to:

- Provide a world class international networking platform and great member experience
- Inspire, disseminate and catalyse state of the art knowledge and thinking
- Convene events that set agendas, harness and amplify the collective knowledge of the global Hydro-Environment community
- Act as a global voice on behalf of the water and environment engineering industry as well as the research community



# Global Water Security

**Too little water**



**Too much water**



Smart water  
conservation and  
management



Urban floods and sponge cities



**Too dirty water**

Coastal water quality management  
Eutrophication, algal blooms and  
fisheries management  
Ecosystem services and science  
policy



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# IAHR Global Water Security Webinar

## Global Water Security = Business opportunities

Population growth, rise of the middle class in many countries, and the advent of the “Second Machine Age” gives rise to many opportunities:

- Innovative solution to floods and droughts – smart urban water infrastructure for water resilience
- Innovative technology to address water scarcity (e.g. membrane filtration for water reclamation; AI for water leakage detection and conservation); a new water economy
- Paradigm shifts in AI and Water – intelligent use of AI and machine learning to break new ground in dealing with ecological conservation and food security
- IAHR provides a truly international platform for networking and business exchange for solving grand water challenges.

## Example of Unmanned Surface Vehicle (USV) Startup Company (ORCA-Tech)

- Emergency response, water quality mapping, floating rubbish cleanup,
- Big data platform and real time control

### 主要产品



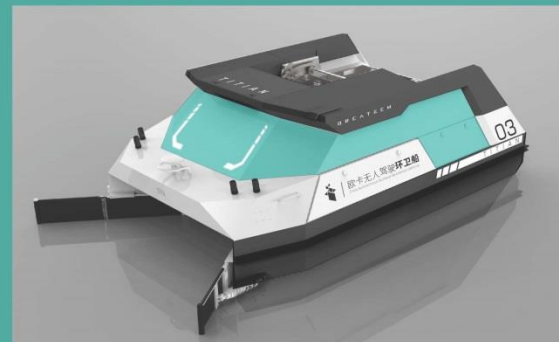
SMURF

城市环卫与小型水上平台



### 控制云平台

集群控制、数据处理



TITAN

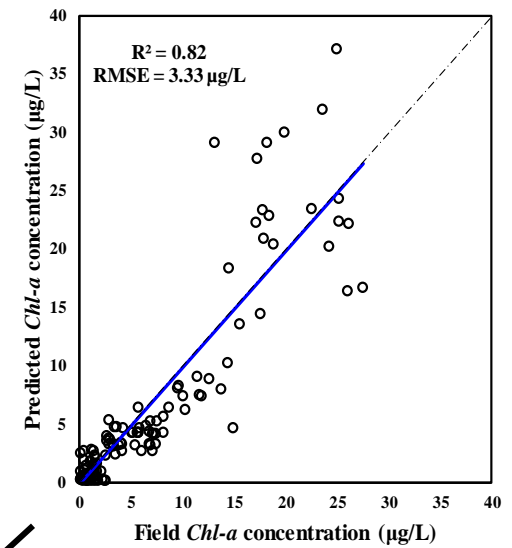
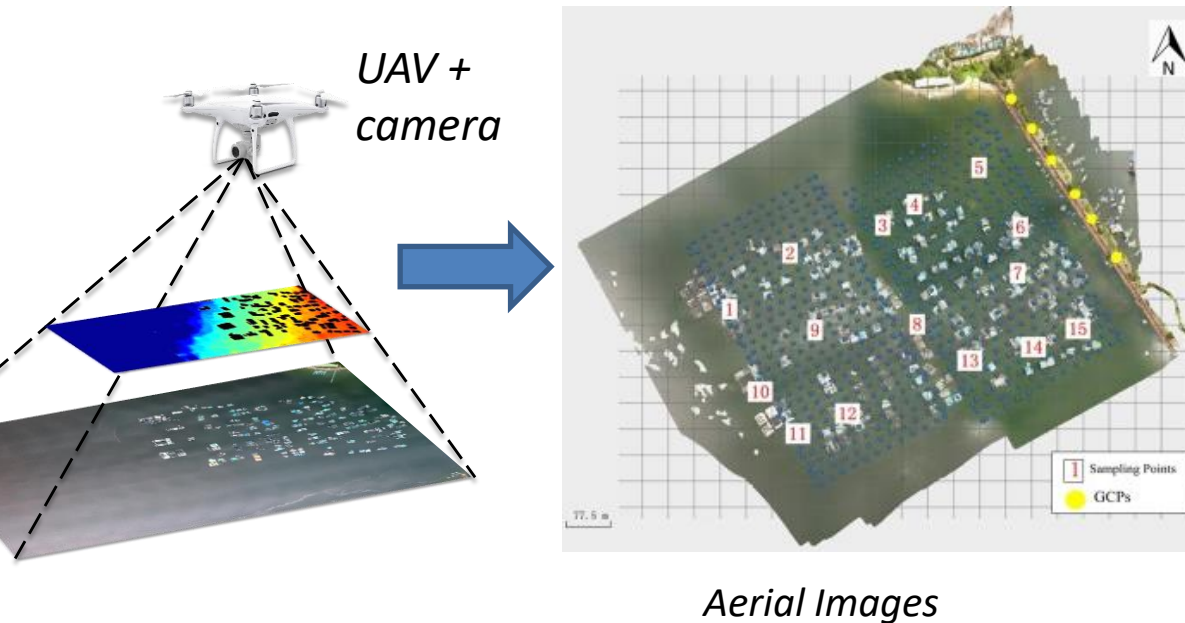
近海巡查与污染综合治理

从城市到近海，从清理到数据，可通过模块的灵活搭载满足各类水环境治理需求



# Harmful Algal Blooms and Fisheries Management

## Determination of surface Chlorophyll-*a* by UAV

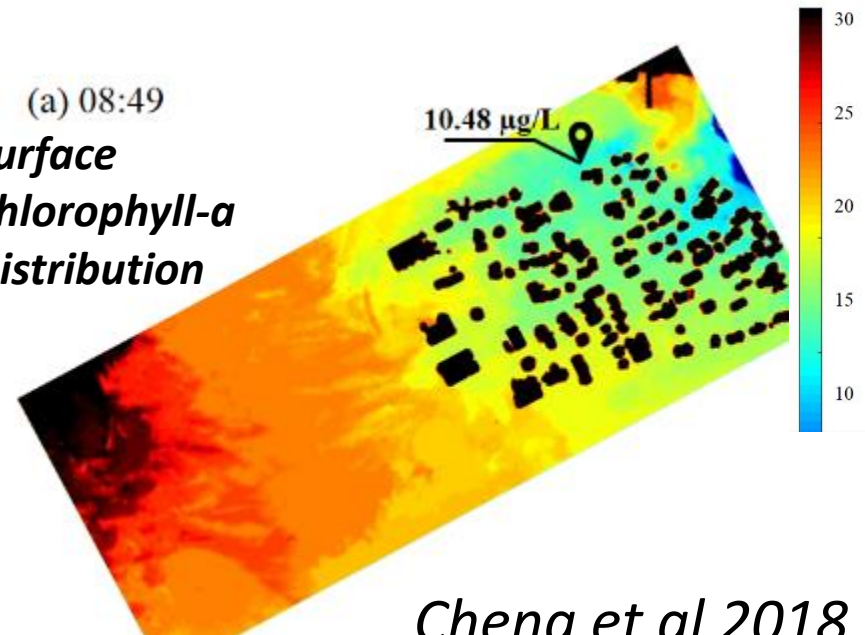


$$C_{\text{Chl-a}} = 19.49 \times \frac{DN_c(\text{red})}{DN_c(\text{blue})} - 8.126$$

Operating an UAV on fish raft



(a) 08:49  
Surface  
Chlorophyll-*a*  
Distribution



Cheng et al 2018



# Image Flow Cytobot (IFCB) + AI for identification of toxic HAB species

- A combination of video capture and laser-based flow cytometry to both capture images of algae cell for identification and measure relative size and chlorophyll fluorescence associated with each image
- Deployed on-site with continuous operation (15 ml sample/hour)
- Fast and reliable way for cell counting and species identification

