

## Using Data and Technology for Decision Support and Risk Management

>> September 25, 2014

Deltas in times of climate change II  
Rotterdam, Netherlands



## Water Management and isolated domains

>> Proactively managing and mitigating flood impact

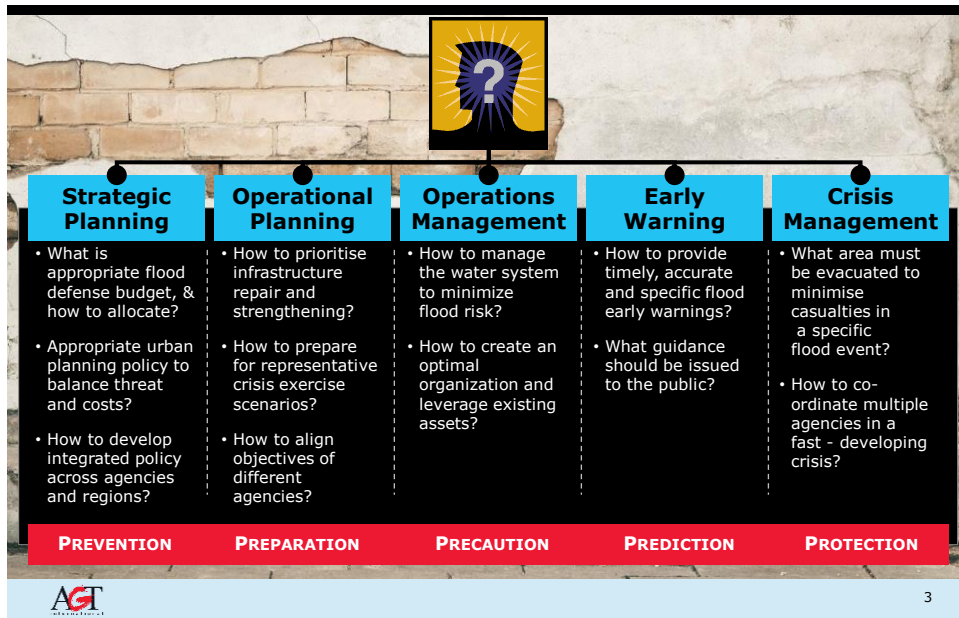


- **Required expertise**

- Hydrological
- Statistical
- Technological
- Operational
- Crisis management

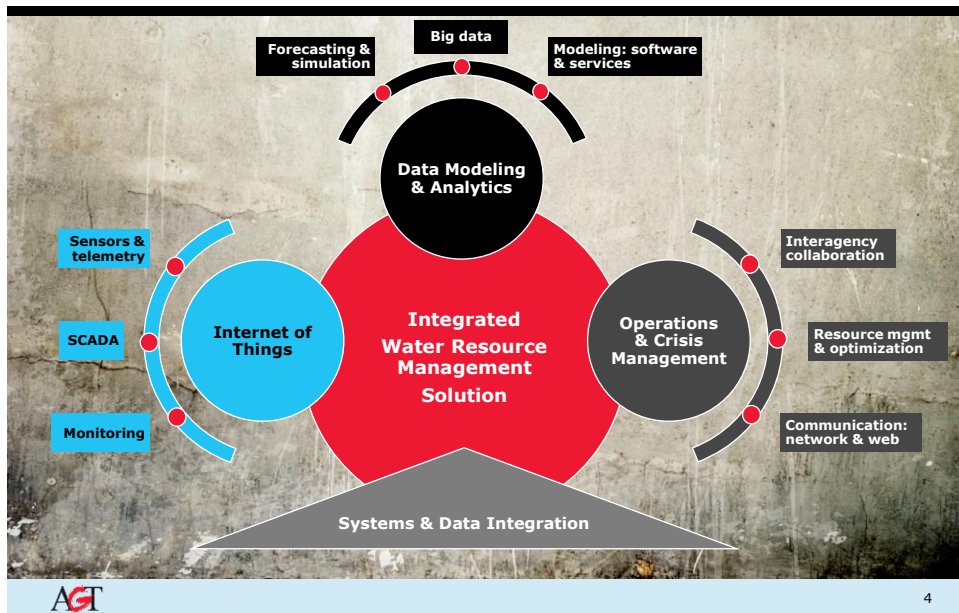
- **In isolation of each other in most countries**

## A variety of complex challenges



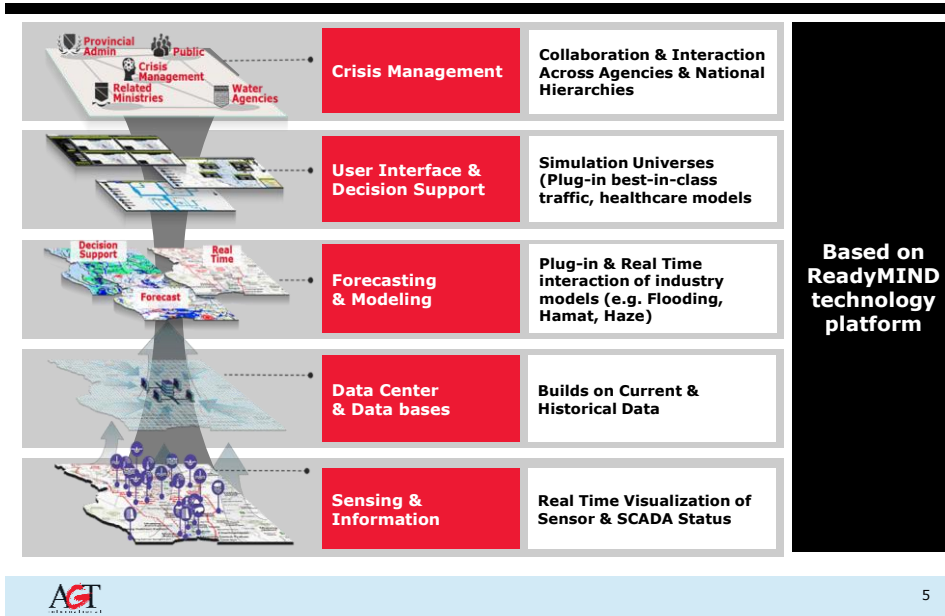
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## The need to bring together previously separate capabilities to address these challenges

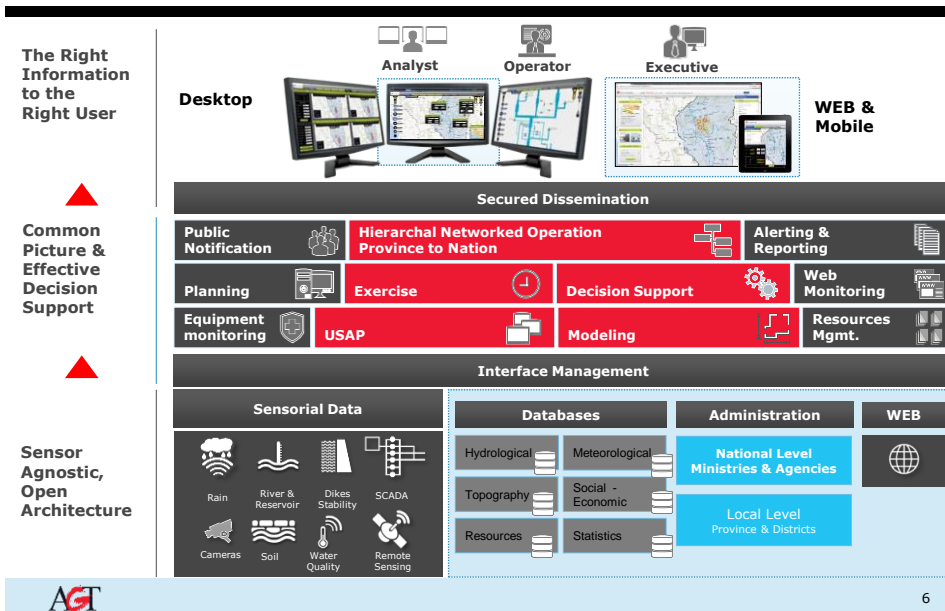


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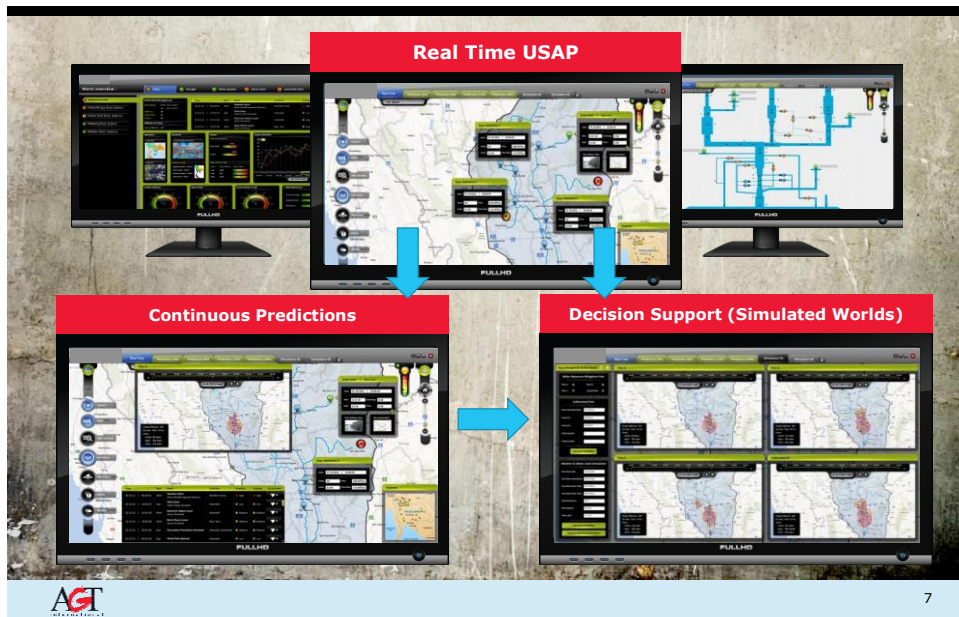
## Integrated Water Resource Management framework



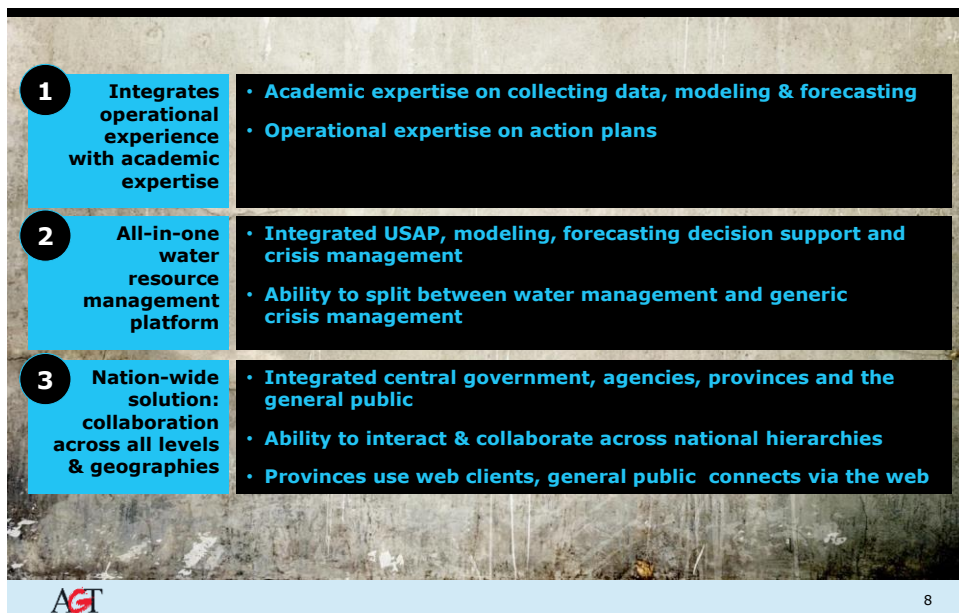
## The Solution Core



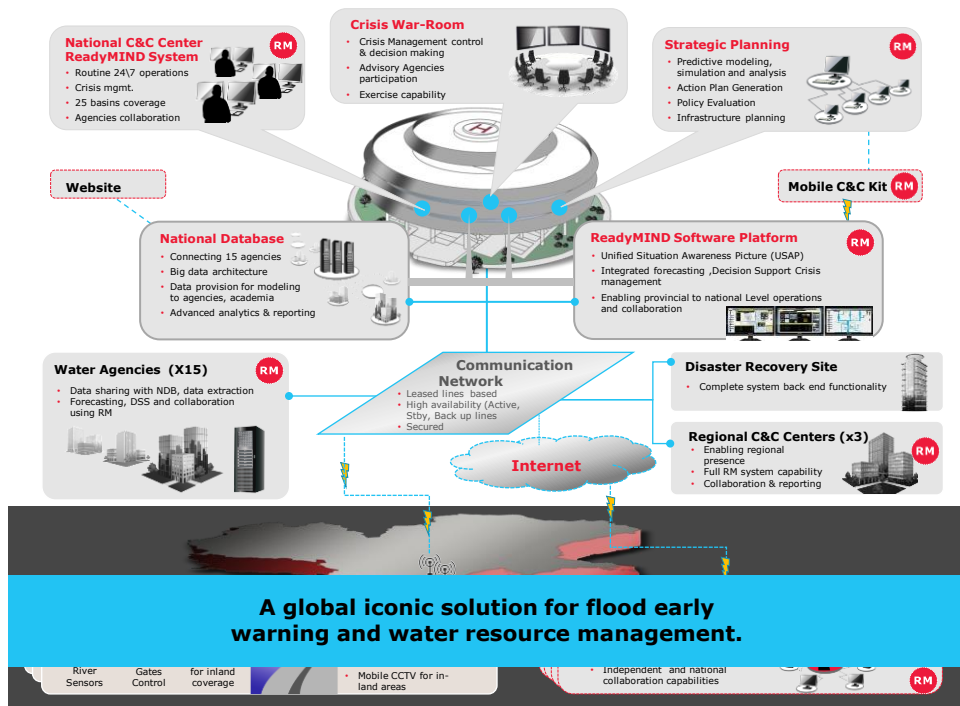
## Focus on Modeling and Simulation - Innovative User Interface Approach



The solutions brings together 3 critical world firsts



## References





## Water Infrastructure Monitoring Projects Examples



### Yellow River: Flood Early Warning & Emergency Response

- Flood Early Warning
- Dike stability monitoring for multiple failure mechanisms
- Integrated Emergency Response to local authorities & province level
- Phase 2 in design: Water Gates, Root stone protection, Land slides further critical dike locations



### Utrecht Province: Flood Early Warning & Dikes Stability

- Flood Early Warning
- Dike stability monitoring for multiple failure mechanisms
- Deployment to local municipality, province and National level water board
- Integration to future central national dike data center (in process)



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## Water Infrastructure Monitoring and Flood Early Warning Projects Examples



### Ijck Dijk: All-In-One SVT

- Large Scale Field Evaluation for Dikes Failure
- Multiple sensors types integration to ReadyMIND
- Early Flood Warning based on Automatic anomaly detection and multivariate time series analysis
- ReadyMIND use for visualization and evaluation by multiple parties



### Bhola Island (Bangladesh) – Erosion Early Warning System

- Performed as part of a broad water management system rehabilitation
- Major activity is Erosion Early Warning System for river bank protection works
- In co-operation with Royal Haskoning (NL)



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