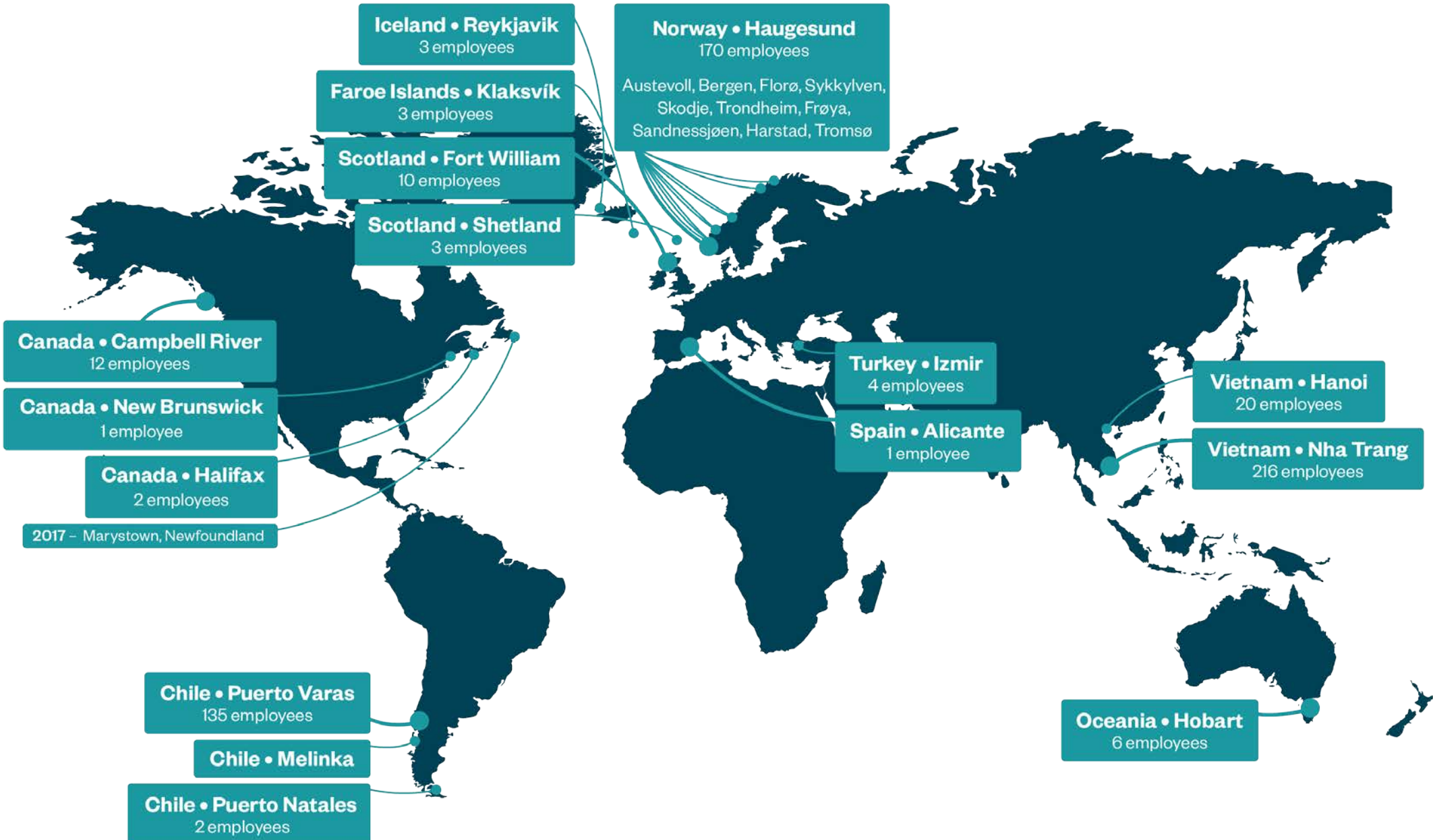


Efficiency in salmon farming

Leiv Tvenning, CMO Steinsvik Group

Where we are — 25 offices in 11 countries supporting the business 24/7



Product categories



Barges



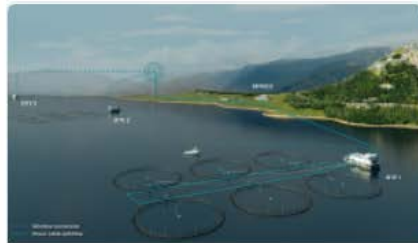
Feeding Systems



Camera Systems



Water Engineering



Remote Operations



Fish Health



Software



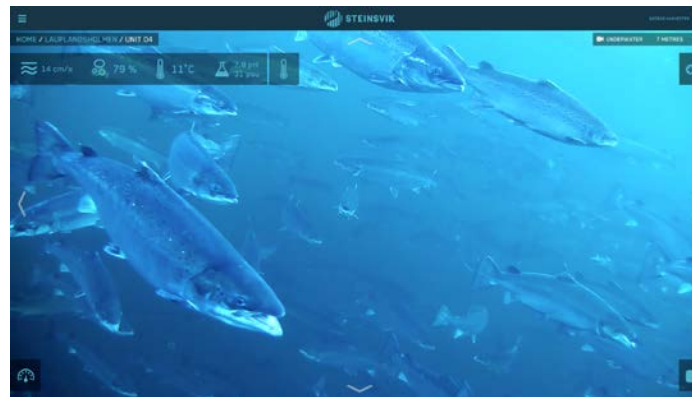
Seaculture Equipment

Soon also

- Aqualine cages, nets and moorings
- AquaOptima RAS

Perspective

- The difference between efficient and inefficient is often just a few % on a daily basis
- To achieve efficiency one needs to look at both control and opportunities
- The fundamentals are growth rate and survival
- Ability to learn from your own experience crucial to become efficient
- All Steinsvik products are aimed at improved efficiency of large scale fish farming; better production and/or more production per employee



Value creation

- The essential value creation in salmon farming;



10NOK/kg



40-50NOK/kg

- Obvious that feeding needs to be prioritized

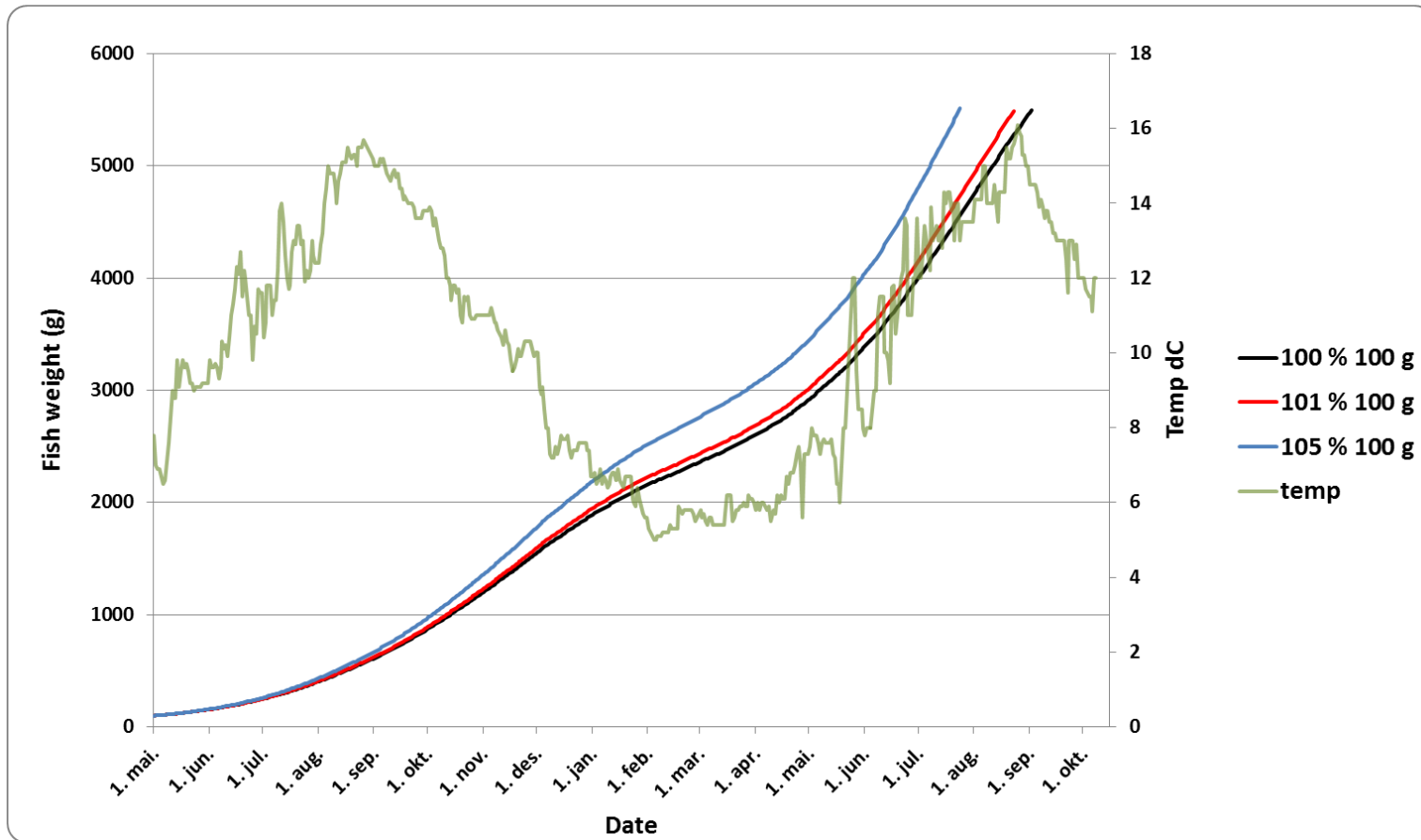
What do you want to achieve?

- Minimize Feed Conversion Rate?
- Maximize growth rate?
- Consistent operative practice from day to day?
- Hold back a little to achieve something on fish quality?
- Get the fish to stay at a desired depth?
- Minimize size variation at harvest?

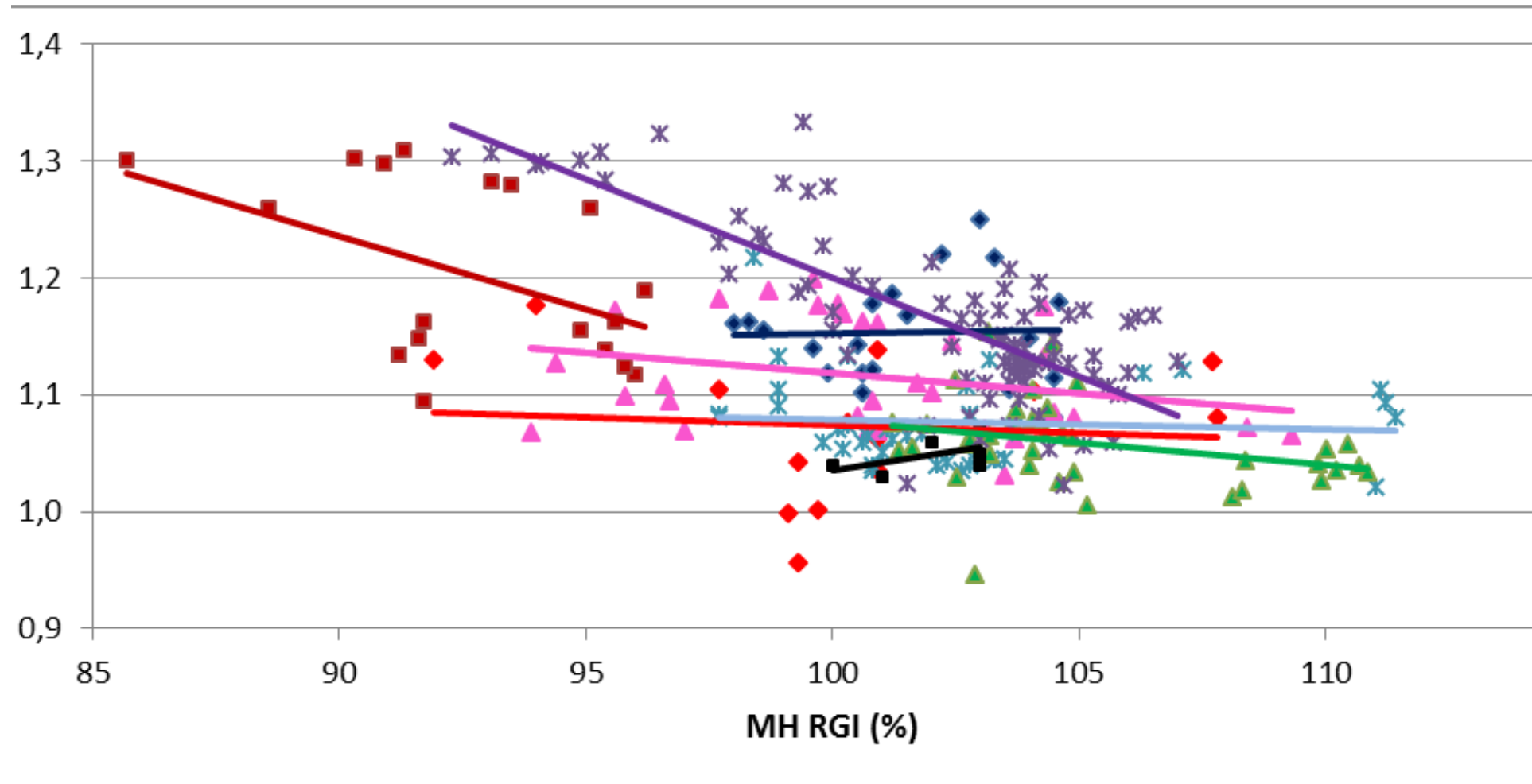
- => Hard to find rational reasons not to allow the fish to grow as quickly as they can or want!



A range of growth rates that seem quite similar day to day



Lots to learn from variations in growth rate and FCR



Capacity and feeding systems

- Unnecessary to lose feeding opportunity because of empty silos or insufficient feeding system capacity
- 2-3 outlets from each silo for flexibility and system robustness
- Not efficient to try to blow feed further than 600meter



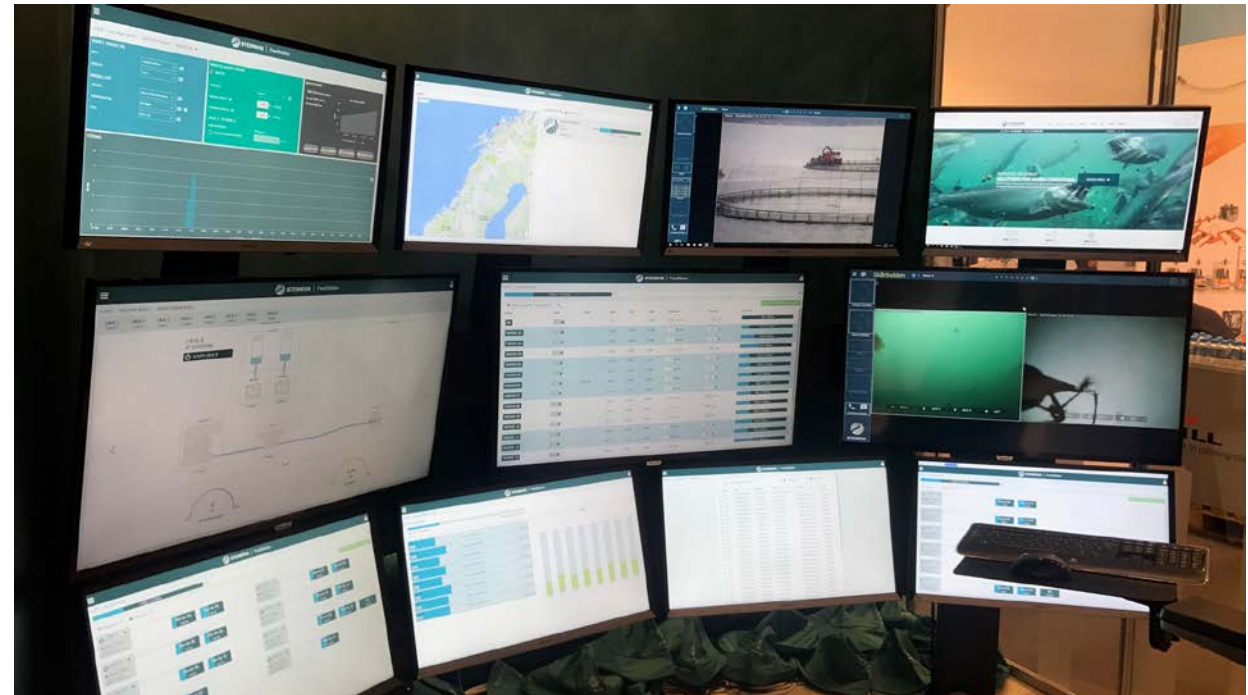
Feeding control

- Important to talk about feeding control separately from biology; A purely technical challenge
- Surface response may be adequate where fish don't have reasons to avoid surface AND that FCR is judged to be more important than growth rate
- Feeding control does not become any better if people are uncomfortable...
- Biomass control is principally not crucial for feeding, but it may seem so in certain cases..
- The key is to be able to see things properly!



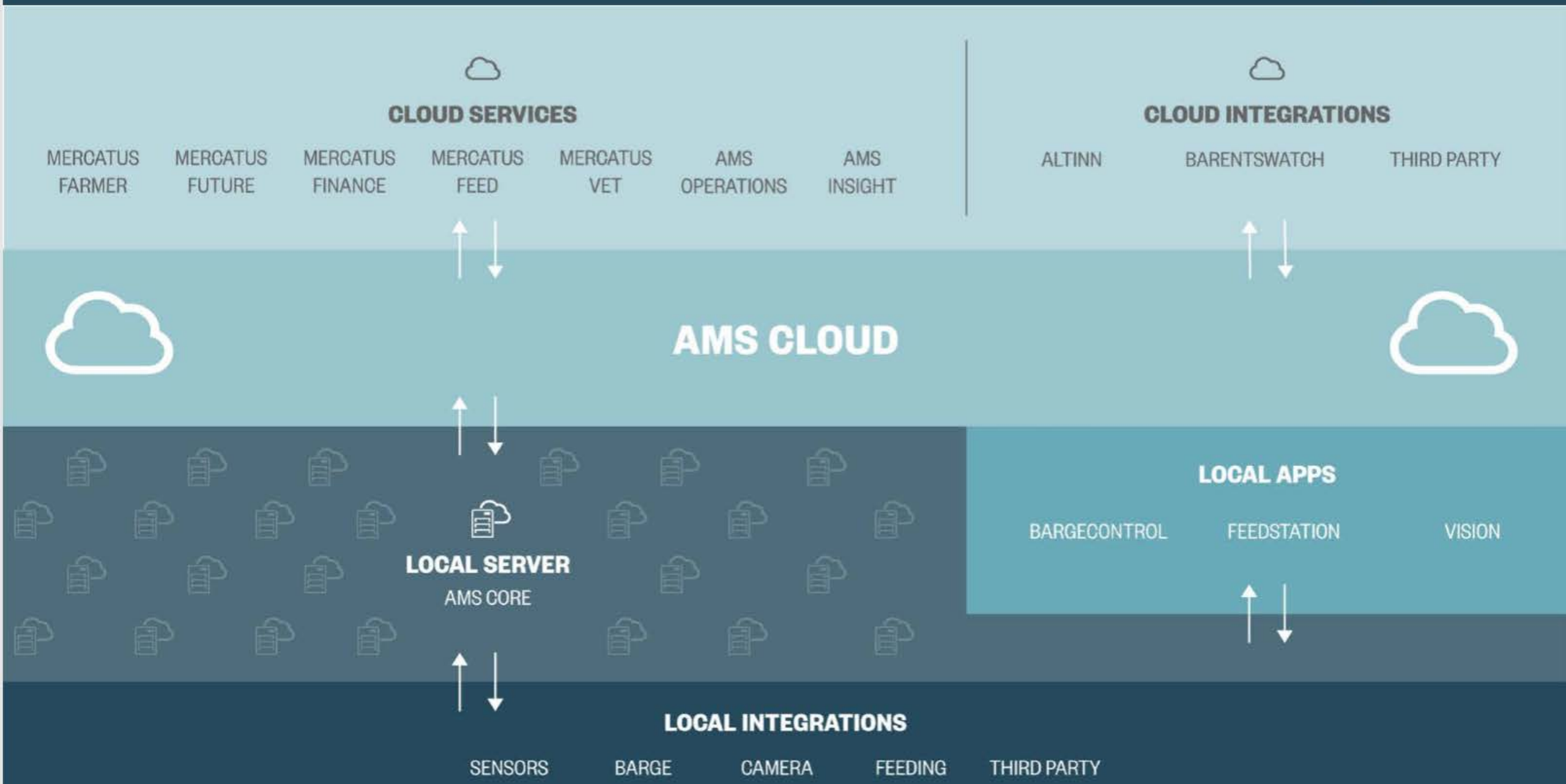
Efficient feeding strategy

- Opportunistic attitude; allow the fish to grow as fast as possible
- Adequate feed availability
- Sufficient feeding capacity
- Flexible and robust setup preventing unnecessary lost feeding opportunities
- Precise control system
- Intuitive feeding software
- Precise feedback mechanisms



Relative fish performance in high resolution





Overview and learning from your own production - AMS



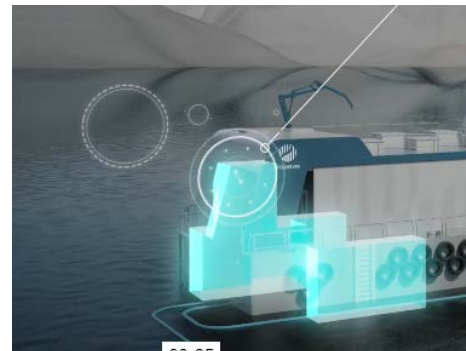
Remote operations

- Expert teams for better growth rate and lower FCR
- Consistency
- Reduce lost feeding opportunities
- Quicker learning
- One person can do more

- Steinsvik has the experience and all technology you need from camera to feeding center



Dead fish handling – Efficient technology from Cage to ensilage



Thanks!