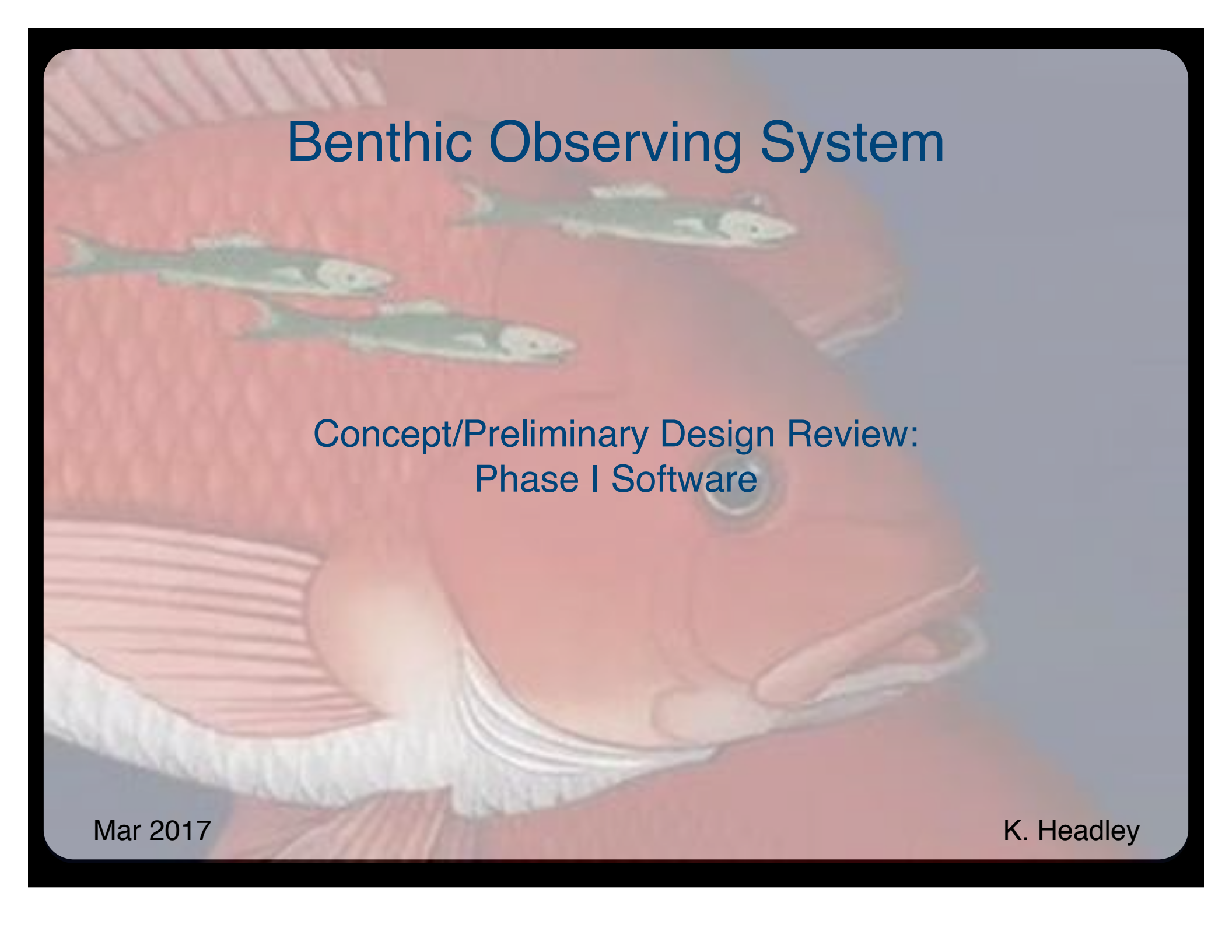




Benthic Observing System

Concept/Preliminary Design Review:
Phase I Software

Mar 2017

K. Headley

Content Outline

- Where the software lives
- CART : Functions, requirements, options
- At the corner of software and hardware
- Implementation approaches
- Selection and recommendations

BOS: Where Software Lives

TNC application

Computer

[Review]
[Telemetry]

Control
Interface

[Control]

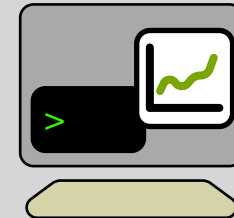
Event
Data

Sensor
Data

Video

[Archive]

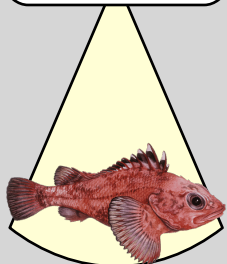
Data
Log



Surface

Sub-Surface

Camera
Lights



BOS
Platform



Control HW

Temp, Depth

Heading

Steer Cam

[Control]

CART: Required Software Features

Control

- Power control
- Start/stop recording

Archive

- Record timestamped data
- Contextual sensors:
 - Temperature, depth
 - Heading, [pitch, roll?]
- Control events:
 - Camera/lights power
 - Start/stop recording

Review

- Data workflows, post-op

Telemetry

- Sensor data
- Video

Optional Features

- Configuration
 - Sample rates, e.g.
- Computation
 - Parse data in real time
 - Generate new derived data streams
 - e.g. turns count

Constraints : Design Goals

- Minimize software development for first iteration
- Architect for future expansion
 - TBD contextual sensors
 - Real time, distributed/mobile displays
 - Control interface
 - Configuration
- Keep it Simple:
 - minimal codebase and development environment
- Minimize complexity in the system

At the Corner of HW & SW

Hardware Options Considered

[Dots : positive characteristics]

Software Considerations

PLC+?

PC+?

OASIS

Embedded COTS

NRE



HW/SW Cost



Firmware



Compilers, Tools



Integration



Lifecycle



Power



Sampling Performance



O&M, Tech Transfer



Implementation Approaches

Platform Technologies

Hardware

Software

COTS

PC
PLC
COTS Relay
Stream Logger
General Logger
COTS
Embedded

Wedge
LabView
Vendor Utils

Custom

OASIS
MMC
BOS new HW

OASIS
Flux
SIAM
BOS new SW

Low Tech

Terminal Log
Internal Log

Candidate Selection

- **CART Coverage**
- **Cost**
- **Schedule**
- **Performance**
- **Risk**
- **Tech Transfer**
- **Roadmap**

Many technologies may apply...

...What Combinations Make Sense?

Comparison of Selected Platforms

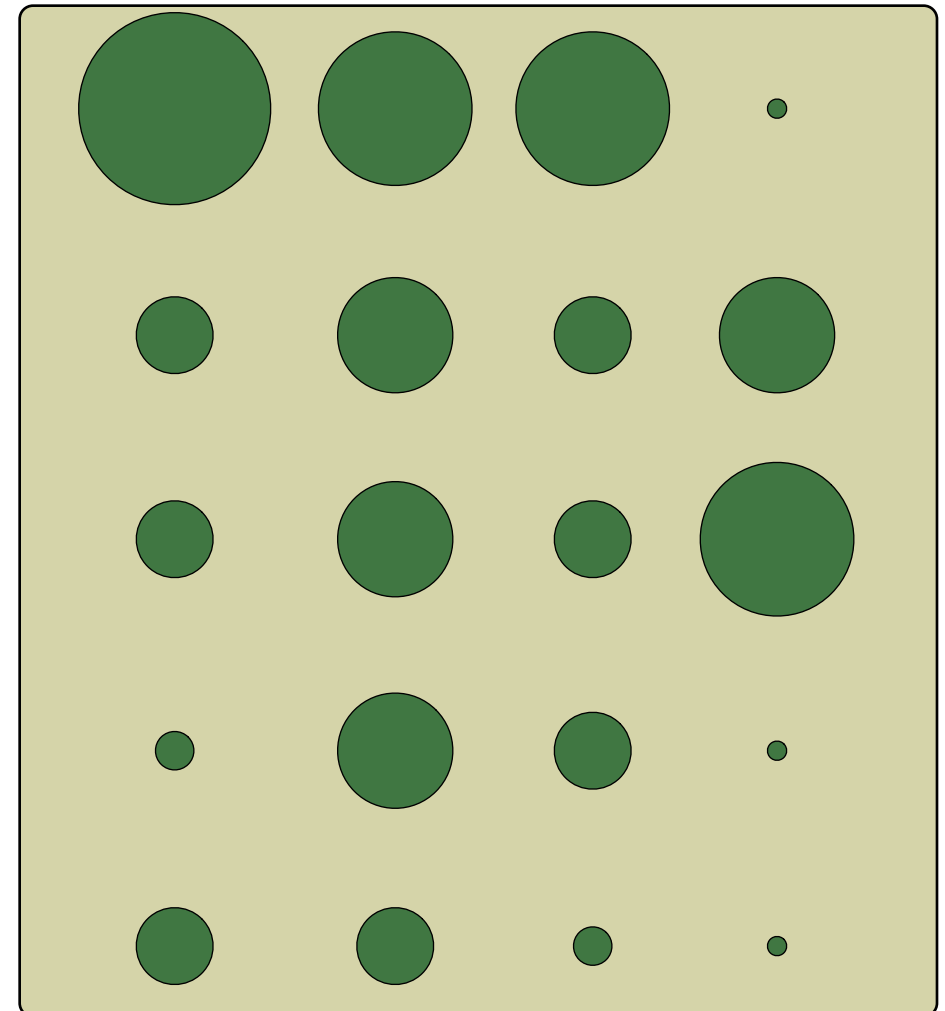
[bigger : better]

- Low Cost
- Easy to use
- Best Option for TNC
- Not good fit for untethered design

- Distributed or autonomous use
- Moderate power

- Reliable, low power
- Moderate integration effort required
- Potential candidate for untethered design

Platform	
	PC, PLC Wedge
	PC, COTS Ctrl Flux
	PC OASIS
	PC, COTS Ctrl LabView
	COTS Emb Custom



Touchscreen Builder

Aggsoft Wedge Browser 3rd Party Video

Touchscreen



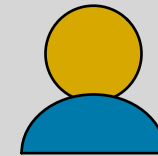
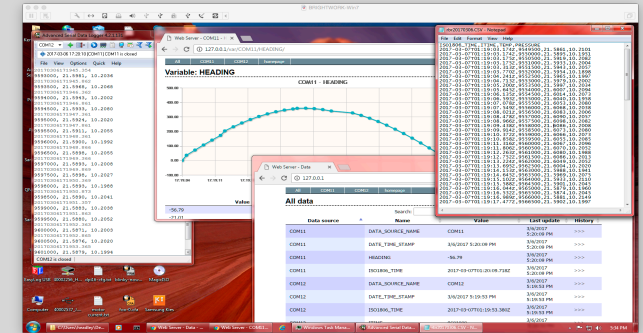
Ladder Logic



PLC



Windows PC



Surface

Sub-Surface

BOS Platform



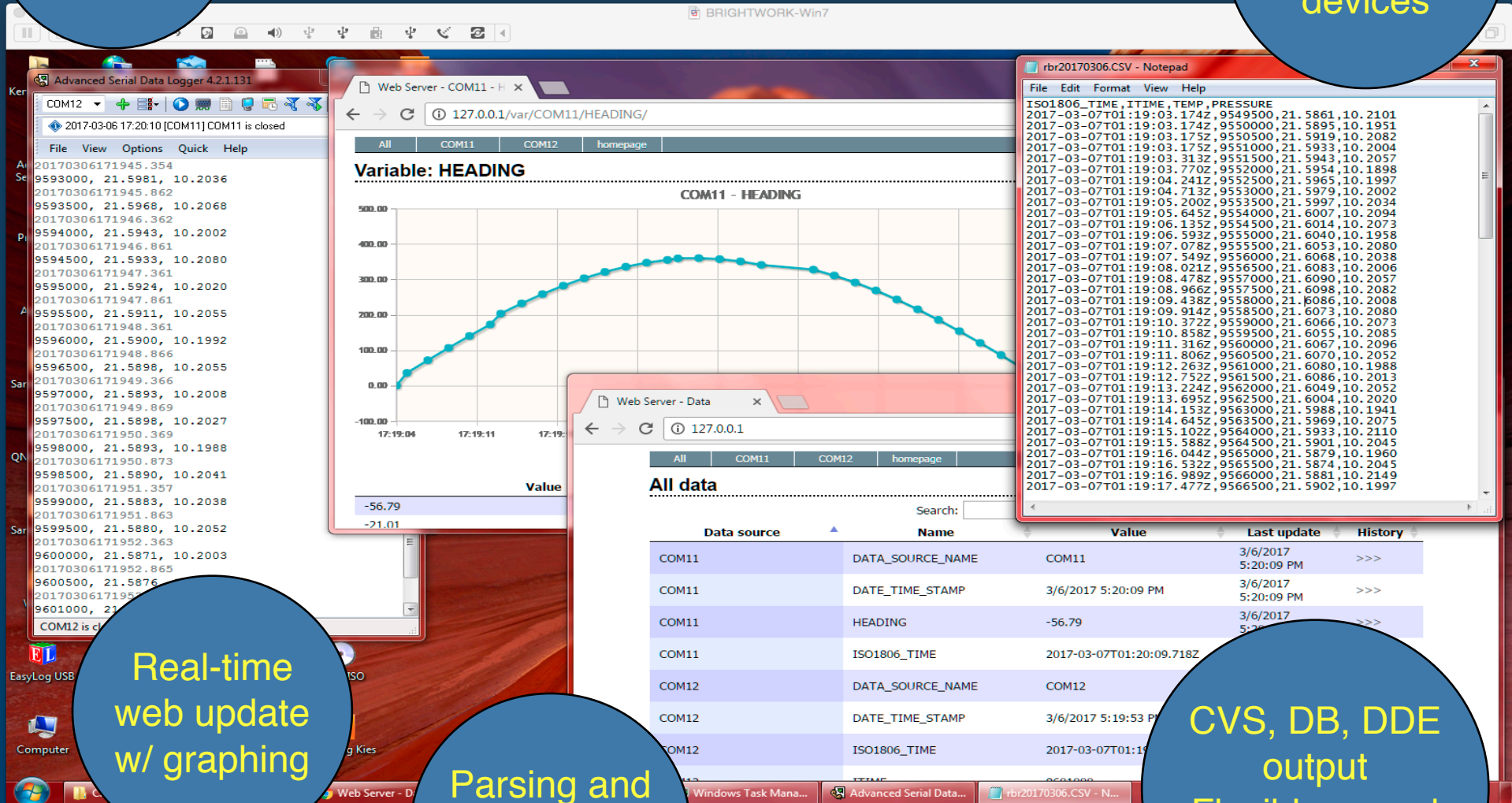
Ladder Logic



Intuitive
user
interface

Screenshot: Aggsoft Wedge Evaluation

Polled,
Streaming
devices



Real-time
web update
w/ graphing

Parsing and
expression
support

CVS, DB, DDE
output
Flexible record
format



Discussion