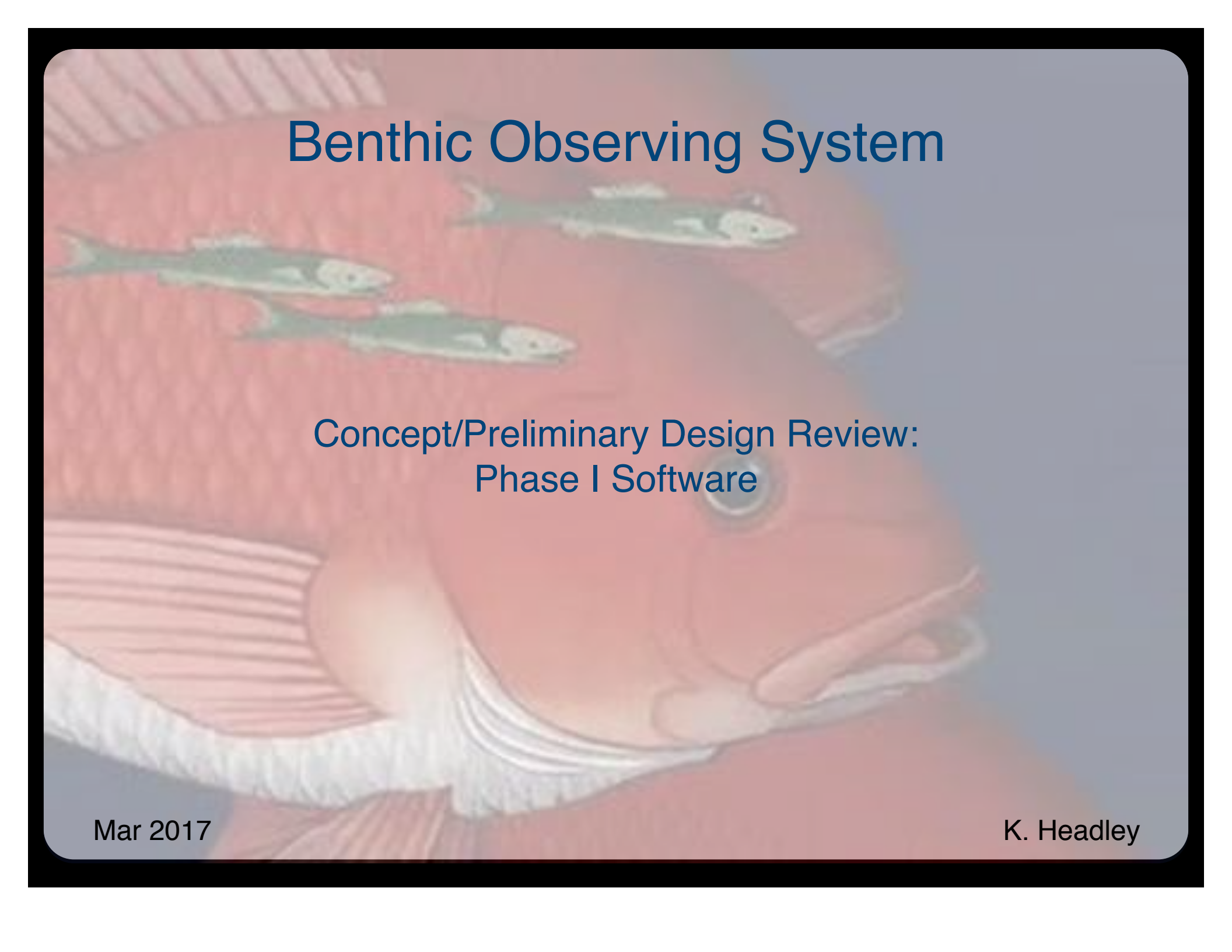




Benthic Observing System

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]

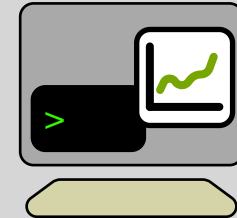
Event
Data

Sensor
Data

Video

[Archive]

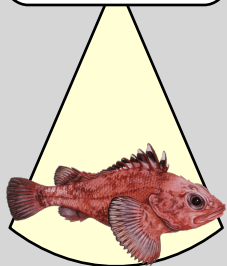
Data
Log



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

[Dots : positive characteristics]

Hardware Options Considered

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

Candidate Selection

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

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

Many
technologies
may apply...

...What
Combinations
Make Sense?

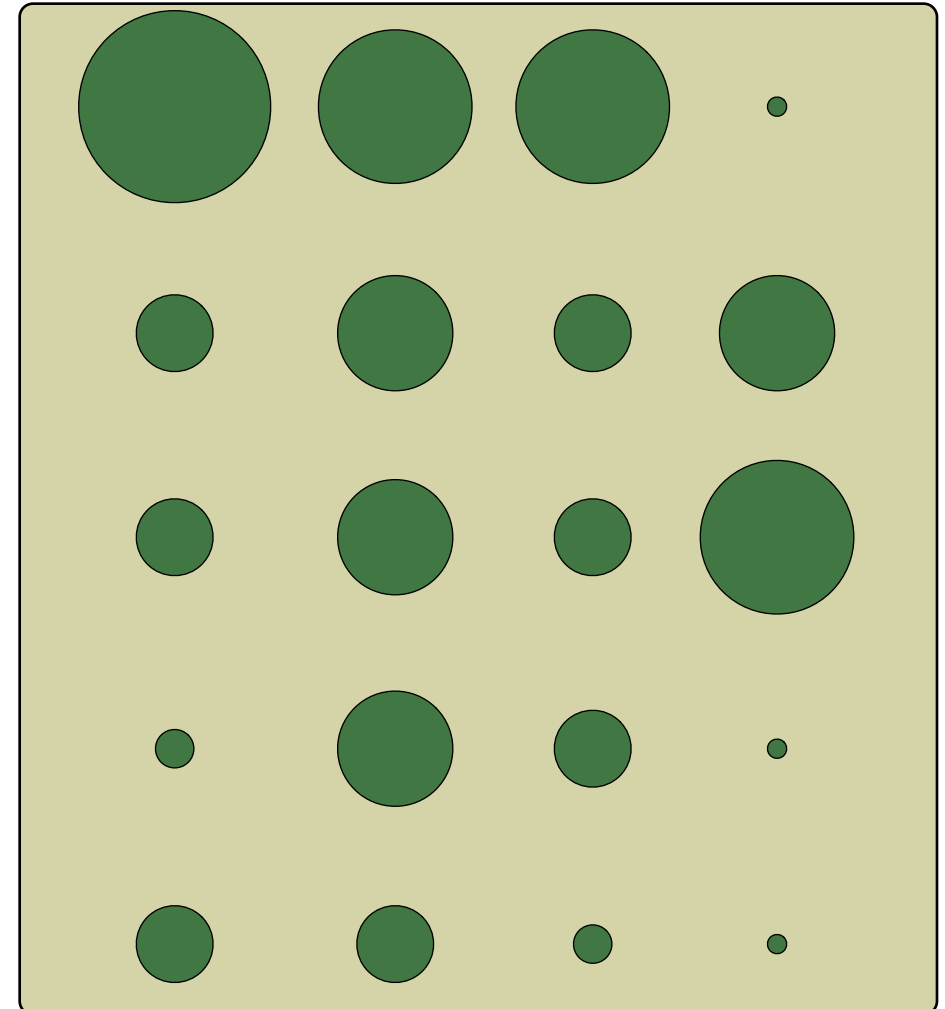
Comparison of Selected Platforms

[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

Cost	Performance	Risk	Roadmap
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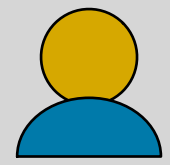
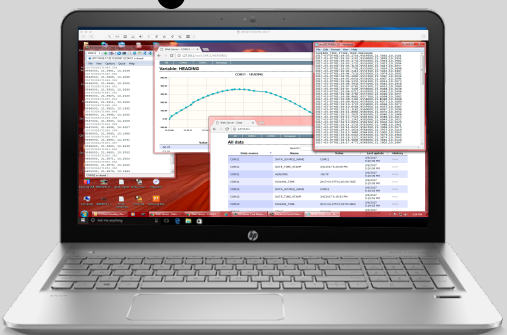


TNC BOS HW/SW Concept

Touchscreen

Touchscreen
Builder

Aggsoft Wedge
Browser
3rd Party Video



Windows PC

Ladder
Logic



PLC

Surface

Sub-Surface



BOS
Platform



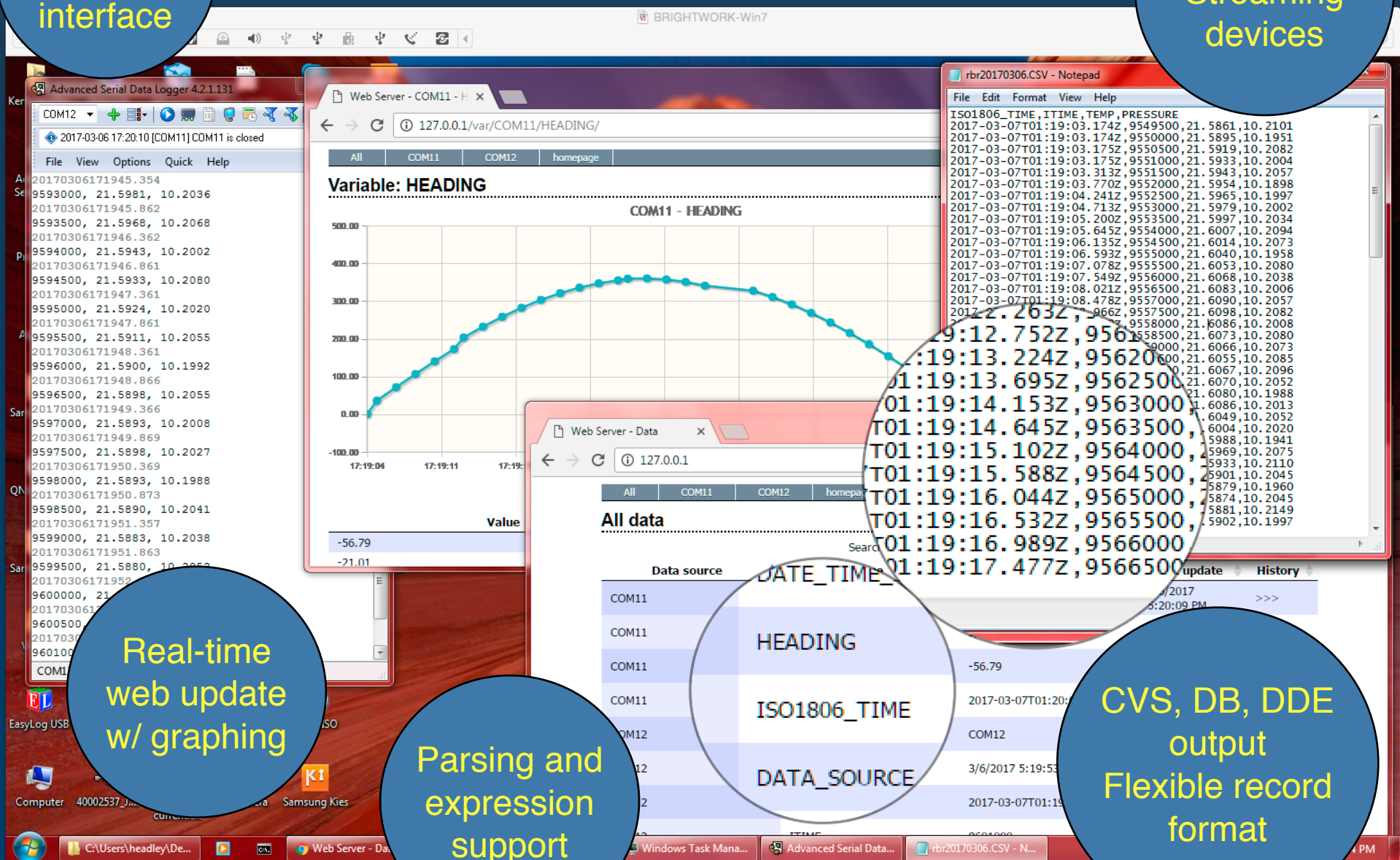
Ladder
Logic



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