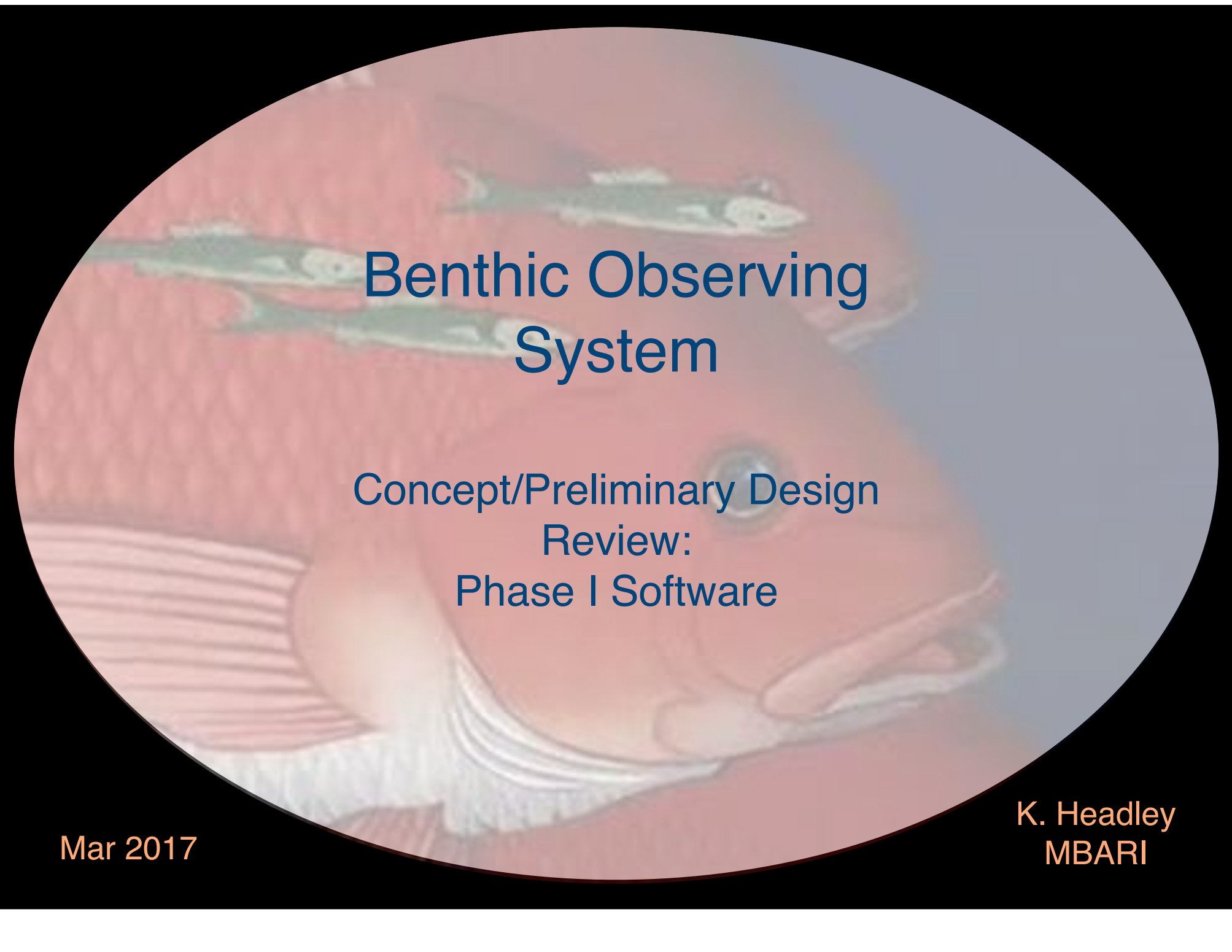




Benthic Observing System

Concept/Preliminary Design
Review:
Phase I Software

Mar 2017

K. Headley
MBARI

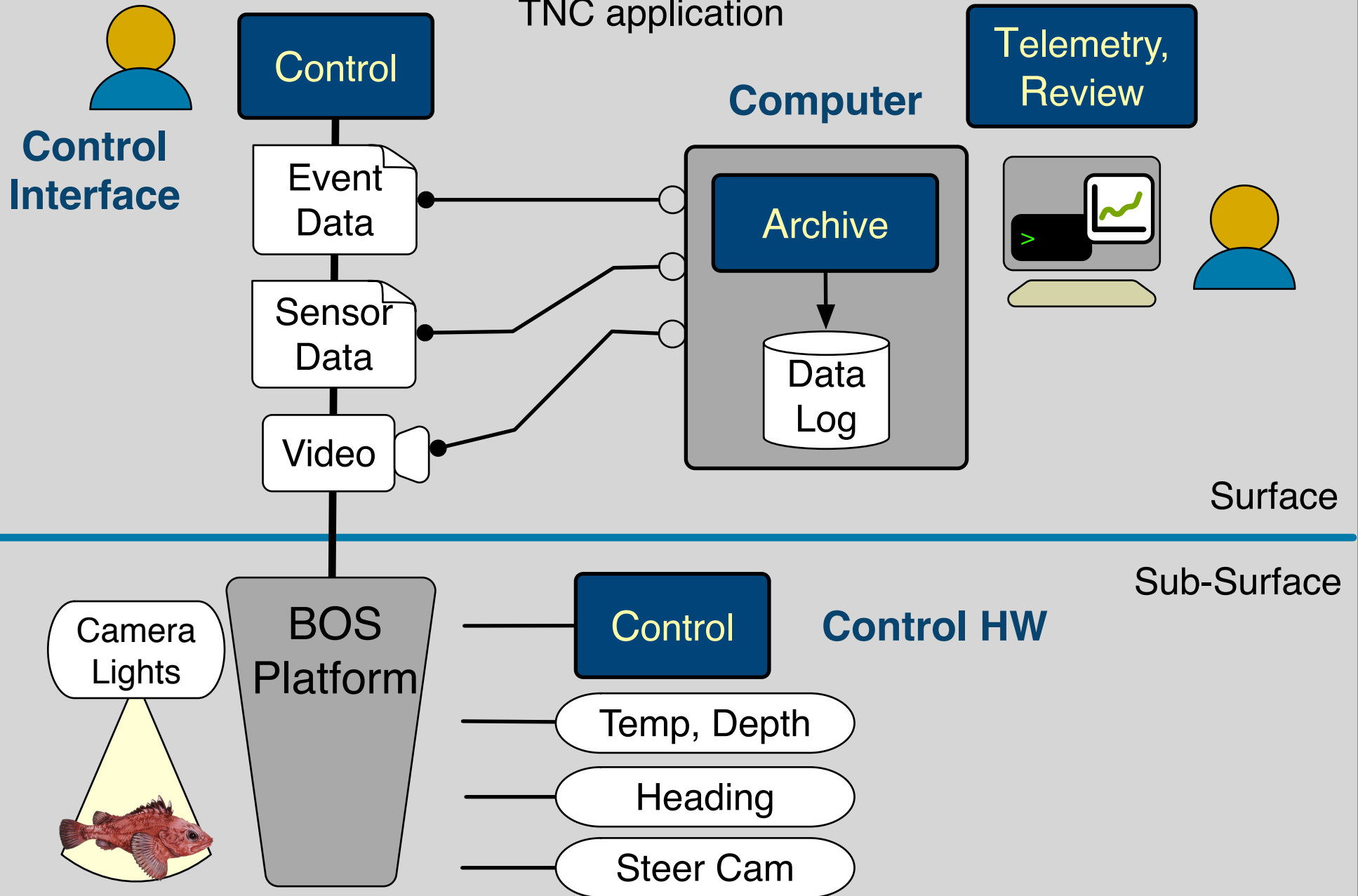
BOS Software

Content Outline

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

BOS: Where Software Lives

TNC application



CART: Required Software Features

Control

- Power control
- Start/stop recording

Review

- Data workflows, post-op

Archive

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

Telemetry

- Sensor data
- Video

Optional Features

- **Computation**
 - Parse data in real time
 - Generate new derived data streams
 - e.g. tether turns count
- **Configuration**
 - Sample rates
 - Instrument configuration

Constraints : Design Goals

- **Minimize software development** for first iteration
- **Keep it Simple:**
 - Make tech transfer easier
 - Minimal codebase and development environment
 - Minimize system complexity
- **Architect for future** expansion
 - TBD contextual sensors
 - Real time, distributed/mobile displays
 - Control interface
 - Configuration

At the Corner of HW & SW

Platform selection : combining HW and SW to cover functional requirements (CART)

HW and SW selection decisions are closely coupled

Hardware choices involve software considerations:

NRE	Lifecycle
HW/SW Cost	Power
Firmware	Sampling Performance
Compilers, Tools	O&M, Tech Transfer
Integration	

Implementation Approaches

- Many options to satisfy requirements
- Key decisions: HW/SW partitioning, Build vs Buy

Platform Technology Options

Hardware

PC
PLC
COTS Relay
Stream Logger
General Logger
COTS Embedded

Software

Wedge
LabView
Vendor Utils

Buy

OASIS
MMC
BOS new HW

Build

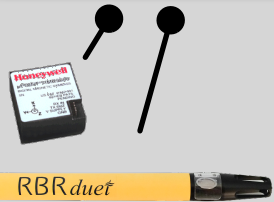
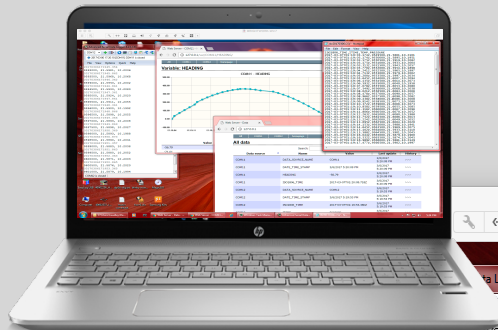
OASIS
Flux
SIAM
BOS new SW

Selection Criteria

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

Software Data Wedge

"Wedges" between instruments and applications



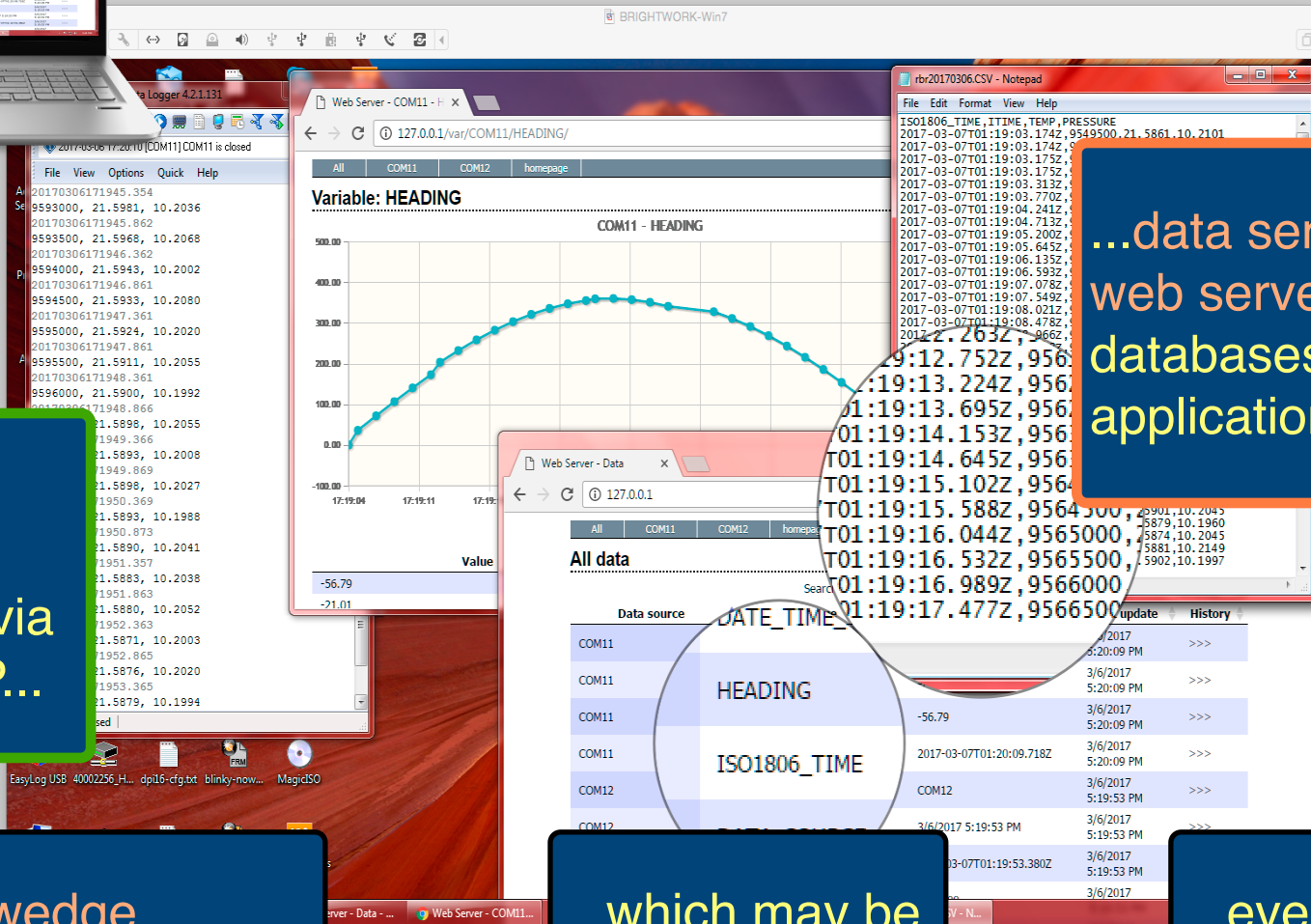
Wedge connects to instruments via serial or TCP...

...wedge acquires data via polling or streams...

...which may be timestamped and/or parsed ...

...even used to create new data via expressions...

...data sent to files, web server, databases, other applications.



Comparison of Selected Platforms

Circle size : Relative advantage

- 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

Platforms

PC+PLC
Wedge

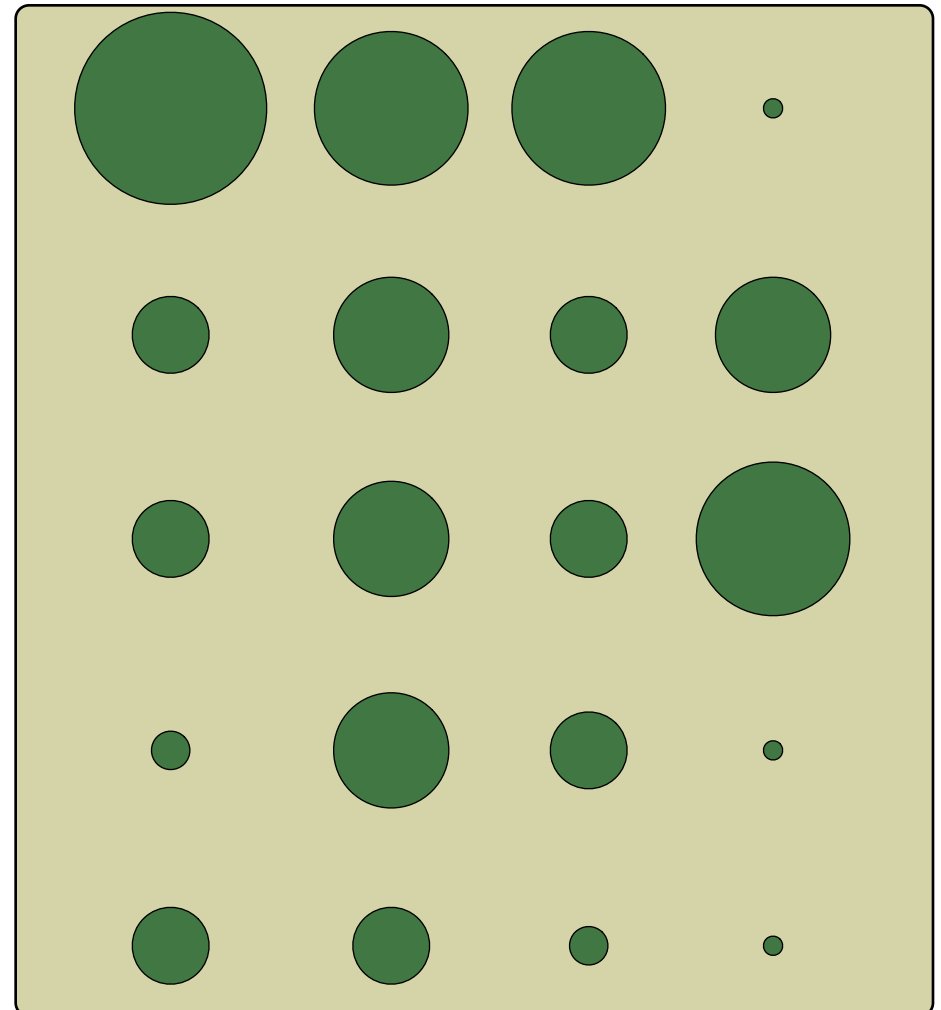
PC+COTS Ctrl
Flux

PC+OASIS
OASIS

PC+COTS Ctrl
LabView

COTS Emb
Custom

Cost, Time
Performance
Risk
Roadmap



Touchscreen
Builder

Aggsoft Wedge
Browser
3rd Party Video

TNC BOS
HW/SW Concept

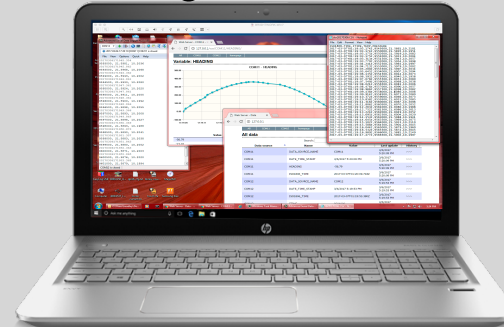
Touchscreen



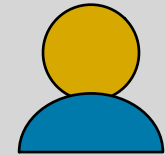
Ladder
Logic



PLC



Windows PC



Surface



BOS
Platform



Ladder
Logic

RBR duet



Sub-Surface

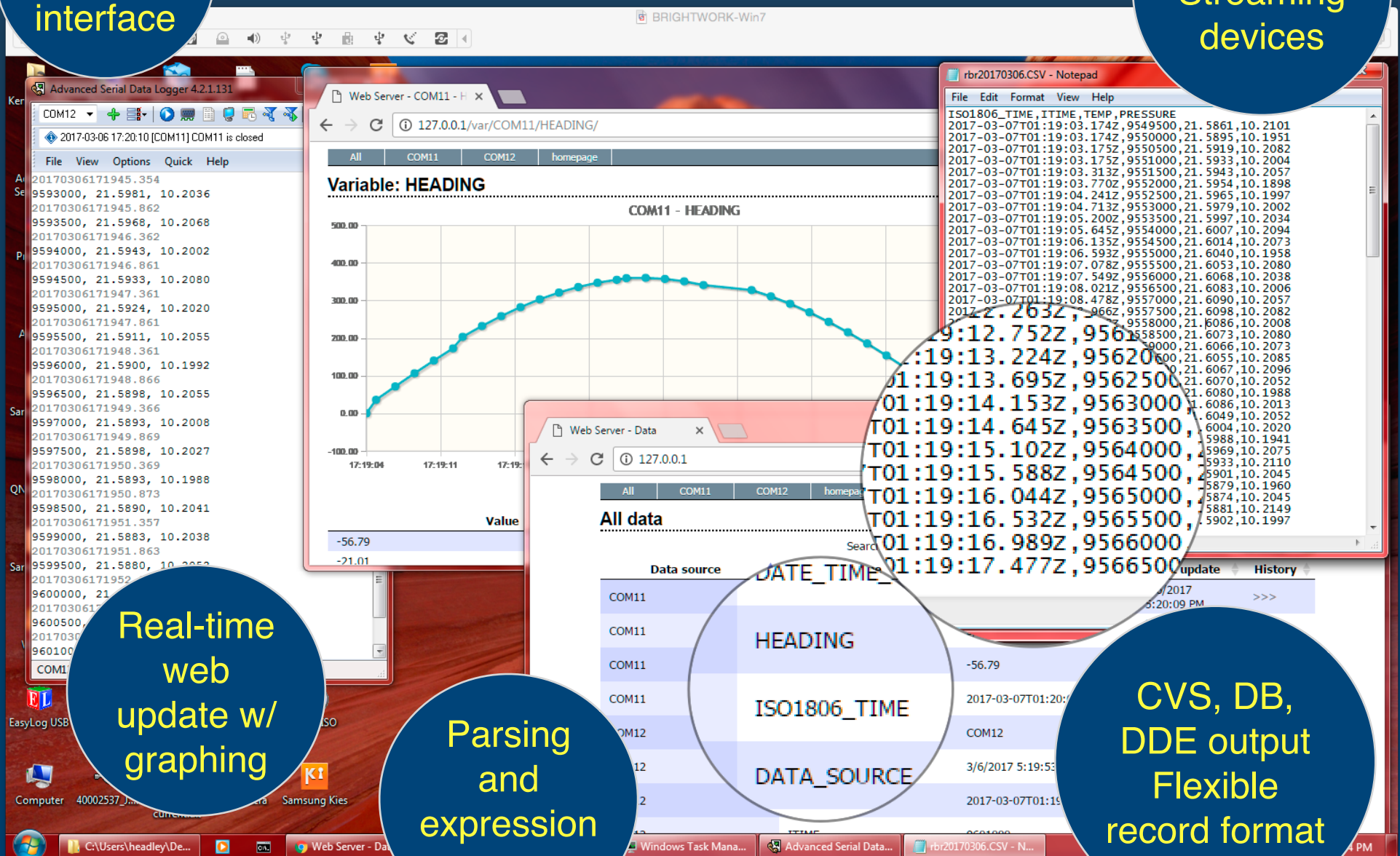
Intuitive user interface

Polled, Streaming devices

Real-time web update w/ graphing

Parsing and expression support

CVS, DB,
DDE output
Flexible
record format





Discussion

