Review UHDAS Concept:

- **Acquisition**: reliable, robust, duplicate feeds
  - reliable heading, accurate heading (**goal = 0.1deg**)
  - 1deg heading error at 10kts → 10cm/s cross-track error
- **Monitoring** and remote troubleshooting
  - data access and figures in at-sea web site
- **Processing**
  - Balance real-time output and post-cruise recovery
  - Minimal effort to “touch up” (if all goes well)
  - Investigate subtle problems and reprocess if necessary
  - Portable code and documentation
- **Stewardship** (improve QA, accessibility, visibility, understanding)
  - Central location for community knowledge (**http://uhdas.org**)
  - Happy Scientists, Happy Techs

50% of typical open ocean velocity signal
UHDAS Systems (2017)

- **17 UNOLS ships**: Atlantic Explorer, Neil Armstrong, Atlantis, Blue Heron, Endeavor, Hugh Sharp, Kilo Moana, Langseth, Oceanus, Pelican, R.Revelle, Sally Ride, Savannah, Sikuliaq, R.G.Sproul, T.G.Thompson, F.G.Walton Smith

- **3 polar ships**: Healy, L.M.Gould, N.B.Palmer

- **11 (+/-) NOAA ships**: Okeanos Explorer, Hassler, G.Gunter, H.Bigelow, Hi`ialakai, N.Foster, Pisces, R.Brown, R.Lasker, Sette, B.Shimada

- **5 “other” ships**: Ka`imikai O Kanaloa, Falkor, Pt Sur, Investigator, Kristine Bonnevie

- **2 (+) Volunteer Observing Ship**: Oleander, Norrona, (in progress: RCCL Adventure of the Seas)
UHDAS Systems (2017)

- 17 UNOLS ships
- 3 polar ships
- 11 (+/-) NOAA ships
- 5 “other” ships
- 2 (+) VOS (Volunteer Observing Ship)
UHDAS: recap of 2017

- new ships:
  - UNOLS: Savannah
  - NOAA: Hassler, Lasker, Gunter, Pisces
  - other: Investigator, K.Bonnevie, Norrona
- refreshed: (Trusty 14.04) (Xenial 16.04)
  - Sally Ride, Ron Brown, Okeanos Explorer, Sikuliaq, KOK
  - Armstrong, Atlantis, Endeavor, Healy, Kilo Moana, Falkor, Langseth, Point Sur, Pelican, Blue Heron
- New People: python, processing, monitoring
  - Thomas Roc, Uggo Ferreira dePinho
- Old People ;) [Jules, Toby, Eric]
UHDAS: recap of 2017

• meetings:
  • Environmental Data Management (Wa. DC) - Toby
  • RVTEC Duluth

• workshops:
  • Univ. Southern Mississippi
  • Texas A&M

(3 days each: ADCPs, UHDAS, CODAS Processing)
UHDAS: recap of 2017

New developments:

- improvements to email reporting
- improving external web page; updating documentation
- adding internal ticketing system (monitoring UHDAS status)
- at-sea web site:
  - link to web-based speedlog display
  - backscatter (now on panel plots at sea)
  - new plots:
    - high-resolution panel plot (with more fields)
    - “last few” vectors
Improvements to UHDAS email diagnostics figures

daily email payload (~50K) (~120K) (~500K)
Artifact in ocean east/west velocity and north/south velocity occurs when ship direction changes (i.e. it turns). Error is worse when ship speed is fast.
Problems: ADCP instruments

<table>
<thead>
<tr>
<th>ship</th>
<th>instrument</th>
<th>repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falkor</td>
<td>WH300, OS75</td>
<td>June 2017 (*1)</td>
</tr>
<tr>
<td>Langseth</td>
<td>OS75</td>
<td>July 2017</td>
</tr>
<tr>
<td>Sikuliaq</td>
<td>OS75</td>
<td>Dec 2017</td>
</tr>
<tr>
<td>Sette</td>
<td>OS75</td>
<td>Dec 2017</td>
</tr>
<tr>
<td>Bigelow</td>
<td>OS150</td>
<td>?? (*2)</td>
</tr>
<tr>
<td>Investigator</td>
<td>OS150</td>
<td>??</td>
</tr>
<tr>
<td>Okeanos Expl</td>
<td>OS38</td>
<td>?? (*3)</td>
</tr>
</tbody>
</table>

(*1) bad wire: “choose between losing Temperature or 1 of 4 beams”
(*2) failed beam
(*3) temperature read 92.64C (leaking endcap?)
Accurate Heading (known/vetted devices)

- **POSMV**: (quality plots)
  - **excellent**: Falkor, Hi`ialakai, Kilo Moana, Nancy Foster, Okeanos Explorer, Thompson, Gordon Gunter, Ron Brown, Hi`ialakai, Armstrong, Shimada
  - **poor/glitchy**: Lasker, Hugh Sharp, Langseth
  - **temporarily broken**: (Gunter and Walton Smith) – bad antenna

- **Seapath**: 
  - **excellent**: L.M.Gould, N.B.Palmer (2), Sikuliaq, Revelle, Ride, Falkor, Healy, Langseth

- **Phins**: Atlantis, Revelle, Ride

- **Ashtech**: 
  - **ADU2/ADU5**: Endeavor, Healy, Oceanus, Sproul, Revelle
  - **ADU800**: Atl. Explorer, Pelican, Pt Sur, Oleander, Norrona, (RCCL Adventure of the Seas)

- **Mahrs**: KOK
### Heading devices to Evaluate (*)

<table>
<thead>
<tr>
<th>device to evaluate</th>
<th>ship</th>
<th>devices for comparison</th>
<th>other comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vector VS330</td>
<td>Savannah</td>
<td>(gyro)</td>
<td>WH300</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>bottomtrack</td>
</tr>
<tr>
<td>SpatialDual</td>
<td>Endeavor</td>
<td>ADU2, ADU5</td>
<td>WH300</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>bottomtrack</td>
</tr>
<tr>
<td>glitchy POSM/V</td>
<td>Healy</td>
<td>Seapath</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Langseth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemisphere</td>
<td>Sally Ride</td>
<td>Seapath, Phins</td>
<td></td>
</tr>
<tr>
<td>Sperry Navigat</td>
<td>Pelican</td>
<td>ADU800</td>
<td></td>
</tr>
<tr>
<td>Trimble (model?)</td>
<td>Sally Ride</td>
<td>Phins</td>
<td></td>
</tr>
<tr>
<td>Trimble SP350</td>
<td>Pt Sur</td>
<td>ADU800 (?)</td>
<td></td>
</tr>
<tr>
<td>Furuno ??</td>
<td>Sproul</td>
<td>ADU5</td>
<td></td>
</tr>
</tbody>
</table>

| other Furuno?       |            |                         |                         |
| other Hemisphere?   |            |                         |                         |
| other Trimble?       |            |                         |                         |

(*) Please help me fill in this table so I can get more comparisons
2018 improvements/projects

- new installations:
  - NOAA ships (for those with transducers)
- renewals
  - Xubuntu 18.04 (Artful Aardvark)
    - Python 3.x
- directions for improvement:
  - add optional/temporary instrument by request
  - work with R2R to improve QA tools
  - better tracking of serial metadata and history
- further software improvements – graphical editor (Qt)
- start to leverage http://uhdas.org
Continuing Request:
Keep us in the loop regarding
(give us lots of warning)

- New ADCP (requires configuration, calibration)
- Replaced/Reinstalled ADCP
- Changes in serial feeds
- Moving a GPS antenna we use, especially for processing
- New attitude devices (we like to evaluate them)
- Changes in networking
  - route to ship
  - infrastructure on ship
- Science Special Needs (triggering, temporary instrument)

give us lots of warning
Protocol

- Always run “End Cruise” before archiving
  - UHDAS adds final metadata to directory
  - UHDAS builds a “reports” directory to help with QA
- Cruise distribution and backup:
  - **ALWAYS** use complete cruise name, eg. cruise distro:
    - KM1701/adcp/KM1701a
    - KM1701/adcp/KM1701b
    - KM1701/adcp/KM1701c

web site: [http://uhdas.org](http://uhdas.org)
email uhdas@hawaii.edu
Final request

... as always:

Send your needy scientists to Jules

The UHDAS Team!