



Len Ricketts, AUV Offshore Manager – US Hydro 2017 Inertia in AUV Adoption

SHIP
OF THE
YEAR



DOF Subsea

STRENGTH THROUGH TRANSITION

Discussion points

- History
- Where Are We Now
- The Problem
- Lethargy or Legacy
- The Future
- Conclusion



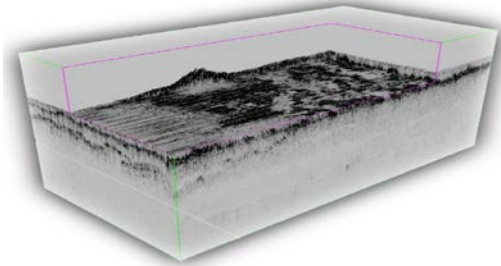
History



- First AUV developed in 1957, University of Washington
- Further developed in the 1970's by M.I.T.
- Application in Oil and Gas was identified as exploration went deeper
- The parallel development of HSE acceptable launch and recovery systems was a significant hurdle to overcome



- Early commercial operations were compromised by persistent research and development programs



- Equipment suppliers were loathe to invest in a market that needed smaller electronics and less power
- Challenges included piloting software, battery endurance and navigation processing

- Offshore offline processes were not in tune with the sheer size of the data coming off the submarine
- Client databases could not handle the resolution or size of the data
- No standard GIS for digital data delivery
- Challenge to hold onto quality offshore personnel
- The late 1990's and 2000's were the defining decades of commercial AUV development driven by the need to solve the problems of the deep

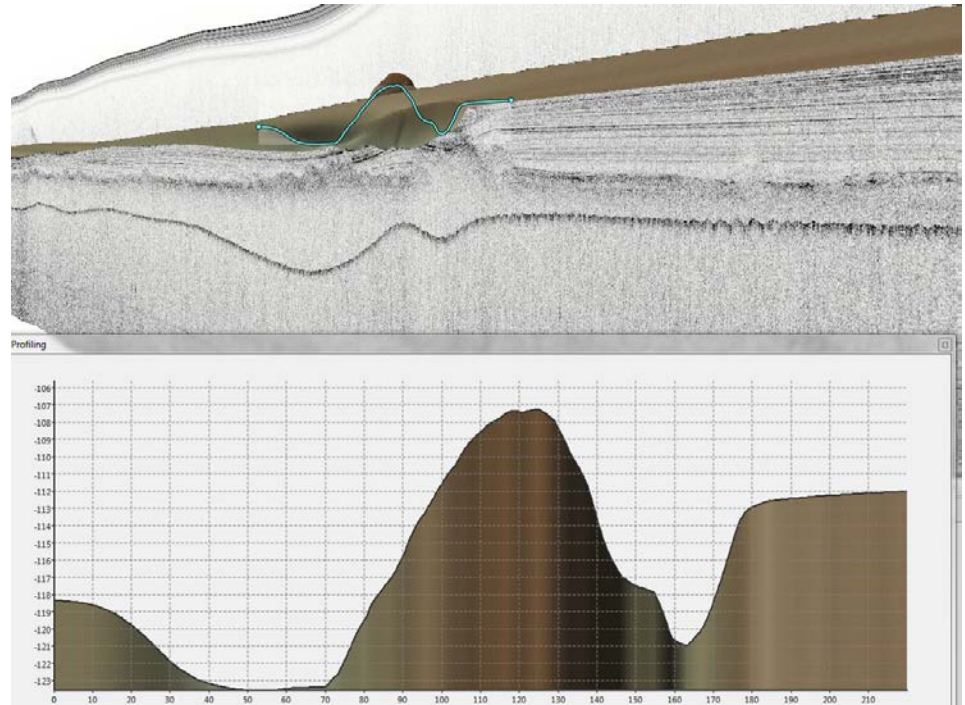
Where Are We Now



- We have moved from “Cut the cable, Fly it stable” commercial selling to a point where the AUV operations is the definition of quality, cost efficient solution to offshore surveys in almost any targeted water depth
- AUVs are no longer viewed as a risky technology
- Offshore conferences and conventions are now characterized by payload systems that are compatible with AUVs

- Reliability and Portability
 - AUVs have developed to such a degree that reliability figures for one AUV reflects >320 dives yielding >25000km of survey line km executed on 8 different vessels for 6 different clients – all this with less than 4% downtime.
- You are now able to get side scan sonar, chirp seismics, multibeam sonar (including mid-water column data), backscatter, leak detection, laser micro-bathymetry and high resolution color photography, all working simultaneously on a single AUV
- All the above are logged against a single navigation file

- As all data are tagged to the same positioning and time base, data are seamlessly accepted into the emerging and maturing technology of data fusion – leading to powerful 3D visualization datasets, helping engineers to understand complex subsea structures
- And yet there still seems to be a pause when considering AUVs...



Lethargy or Legacy



- The cost of cost per line km...
- Arguably, this has to be the best and worst strategy for AUV operations:
 - Best because it forced AUVs into the oil and gas industry with a fierce focus on being cheap
 - Worst because it fostered a cost based approach to AUV surveys instead of a value based approach
- And we are still recovering from this strategy ...

- We are still not (in the main) using an AUV in a way that derives full benefit
- In Greenfield surveys, line spacing is opened to the point where a digital terrain model is just achieved
- Flying height is adjusted so that these line spacing's are achieved
- This compromises resolution on the multi-beam data
- This altitude is not optimal for side scan sonar data acquisition

- We are in the midst of a transition phase from some of the tasks being transferred from ROV to AUV. AUVs can now do:
 - Debris and wreck hunt surveys
 - Greenfield site and route determination surveys (sometimes in conjunction with geotechnical investigations)
 - Brownfield tieback surveys
 - Acoustic pipeline surveys
 - Environmental mapping surveys
 - Archaeological surveys

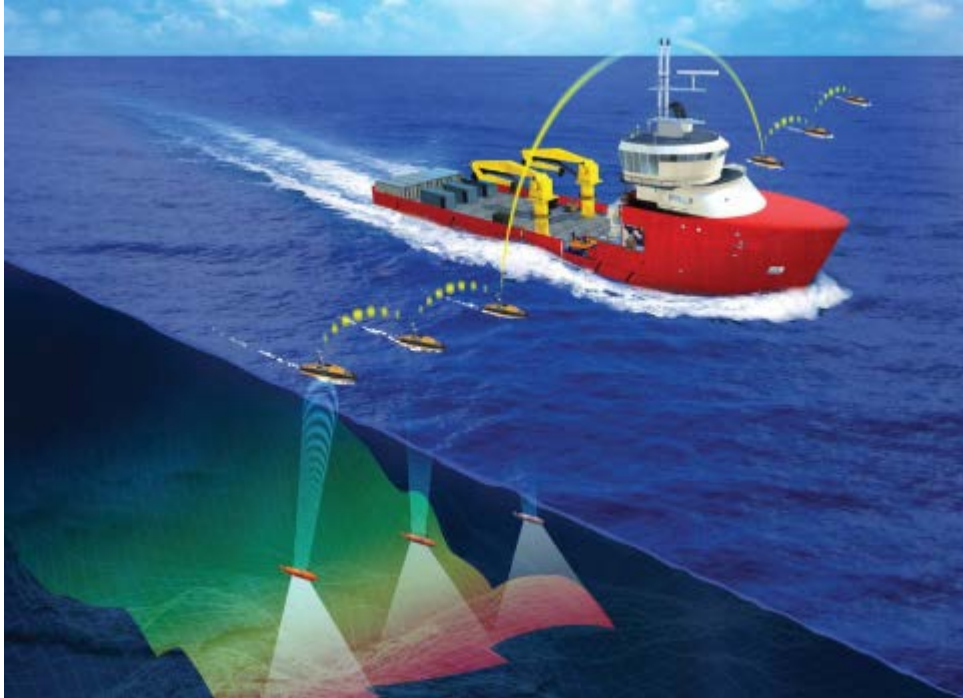
- We are in the midst of a transition phase from some of the tasks being transferred from ROV to AUV;
 - Are companies that are heavily invested in ROVs and construction vessel really interested in porting operations over to AUVs?
 - Is anybody ready to accept an AUV pipeline inspection?
 - Are client's databases ready to receive and manage large size AUV datasets?
 - Do we understand the long term commitment to the technology?

- Are small AUVs confusing the market?
 - Selling AUV services that does not deliver position auditable datasets is not doing the industry any favors
 - The problem with unaided AUVs is that often they do not survey the intended target due to ambient sea conditions like current
- Are Fast/Hybrid ROVs a transitional phase?
 - Fast ROVs are filling a niche where clients want ROV based control and online data with AUV speed
 - The problem with this is that there is no force multiplier – that is as good as it gets in terms of cost efficiency
 - Still need an expensive vessel with associated fuel costs

The Future



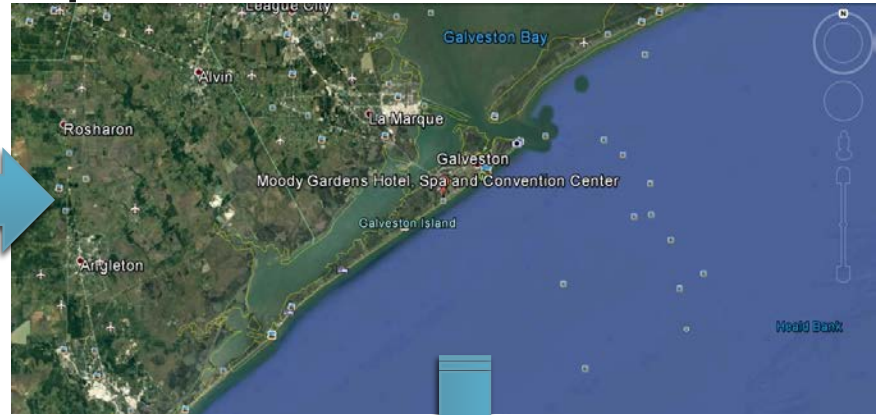
AUVs and USVs



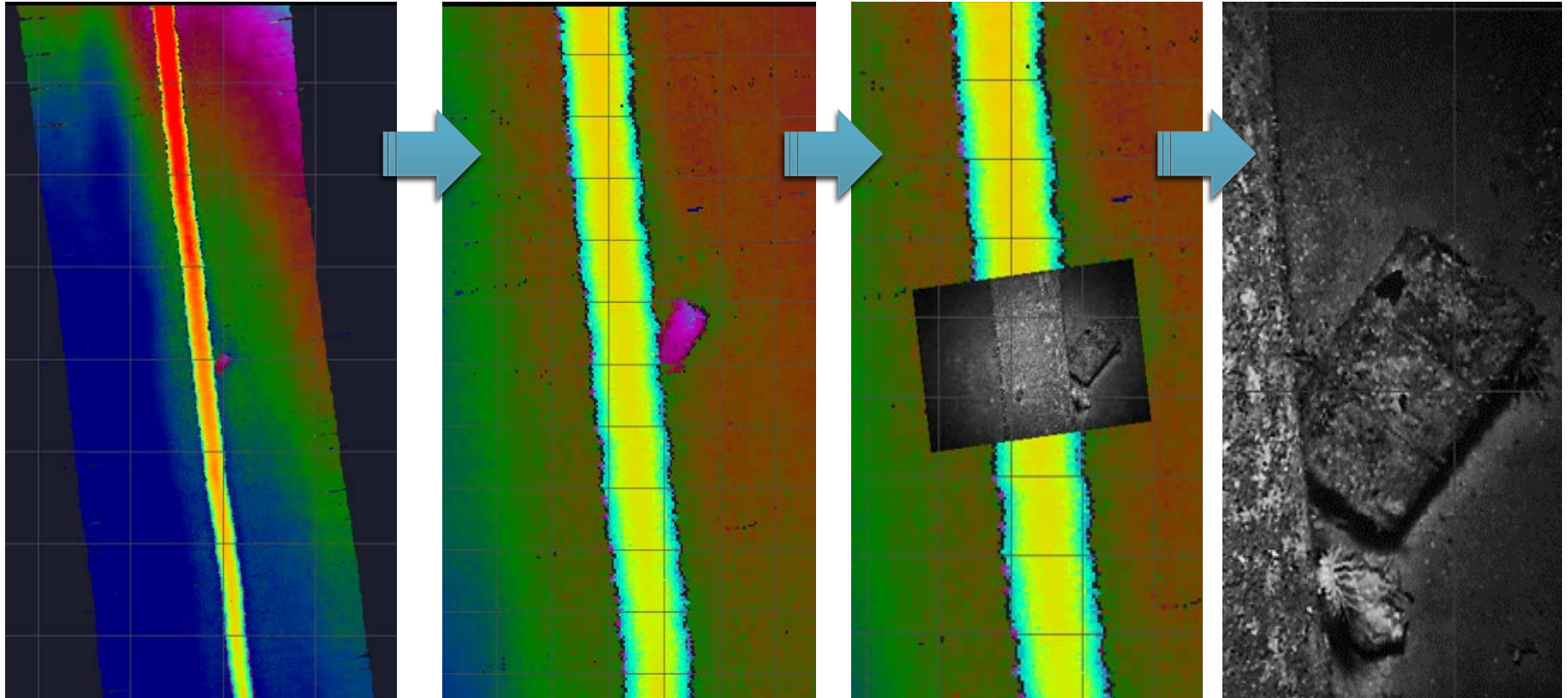
- Force Multiplier...
 - n x AUV Datasets
 - n x Offline Personnel
- Improvements in satellite beam width to usher in onshore processing
- Battery capacity will improve
- No matter what – data will increase

- And what do we do with all that data?
 - Data volume is regarded as a big stumbling block
 - More resolution = More problems
 - Some clients view their database as struggle to relate their most recent survey easily to a previous survey
 - Data are not easily accessible by all stakeholders - within a company
 - But should larger datasets with more resolution be problematic

If we can do this on our smartphones & tablets....



What stops us from doing this?

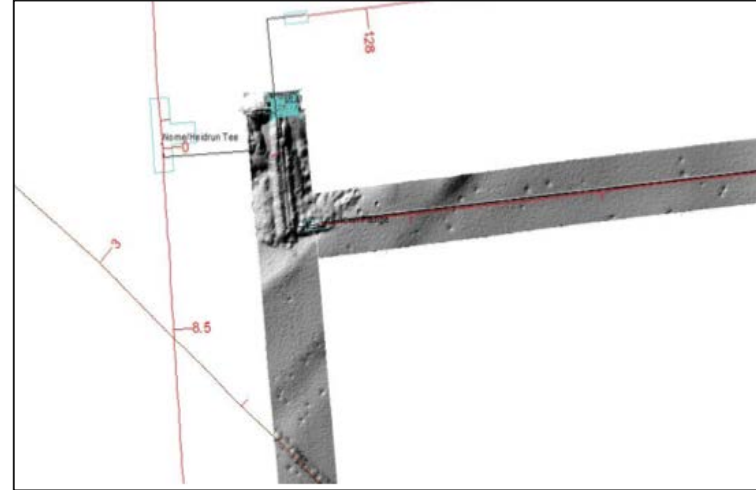


Conclusion



- AUVs are here to stay:
 - We need to learn how to acquire, manage, deliver and accept large datasets
 - We need to review our cost based approach to surveys especially at FEED stage
 - Pipeline surveys will be undertaken by AUVs – we need to define deliverables that utilize the unique advantages of an AUV survey and NOT try to replace data from an ROV survey
 - We should be looking at company cloud servers to distribute data to invested parties
 - We need to design information systems so that they are fully interactive – over multiple surveys
 - We need to realize that if we choose to do a cheap (disregarding resolution) survey, we will lose the benefits the next time we do the

- It is not just the survey execution that must change!



- It is like Analogue to Digital..

Thank you!

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