Advances in Hydrographic Data Processing

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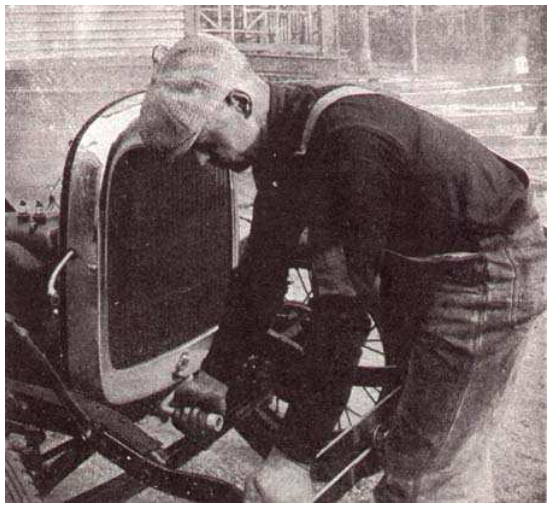
SAAB Defence and Security

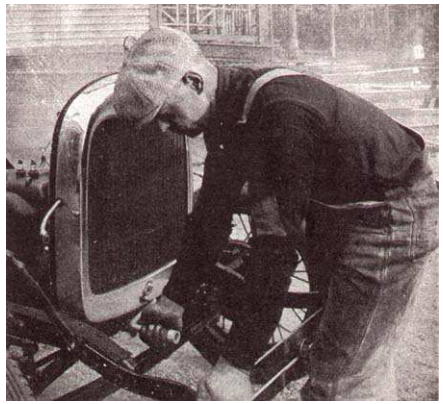



LOCK
ACC

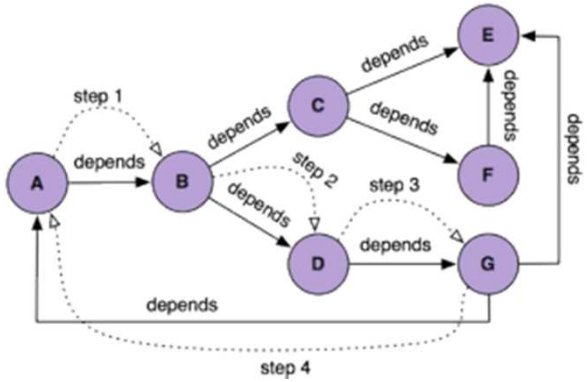

ENGINE
START
STOP

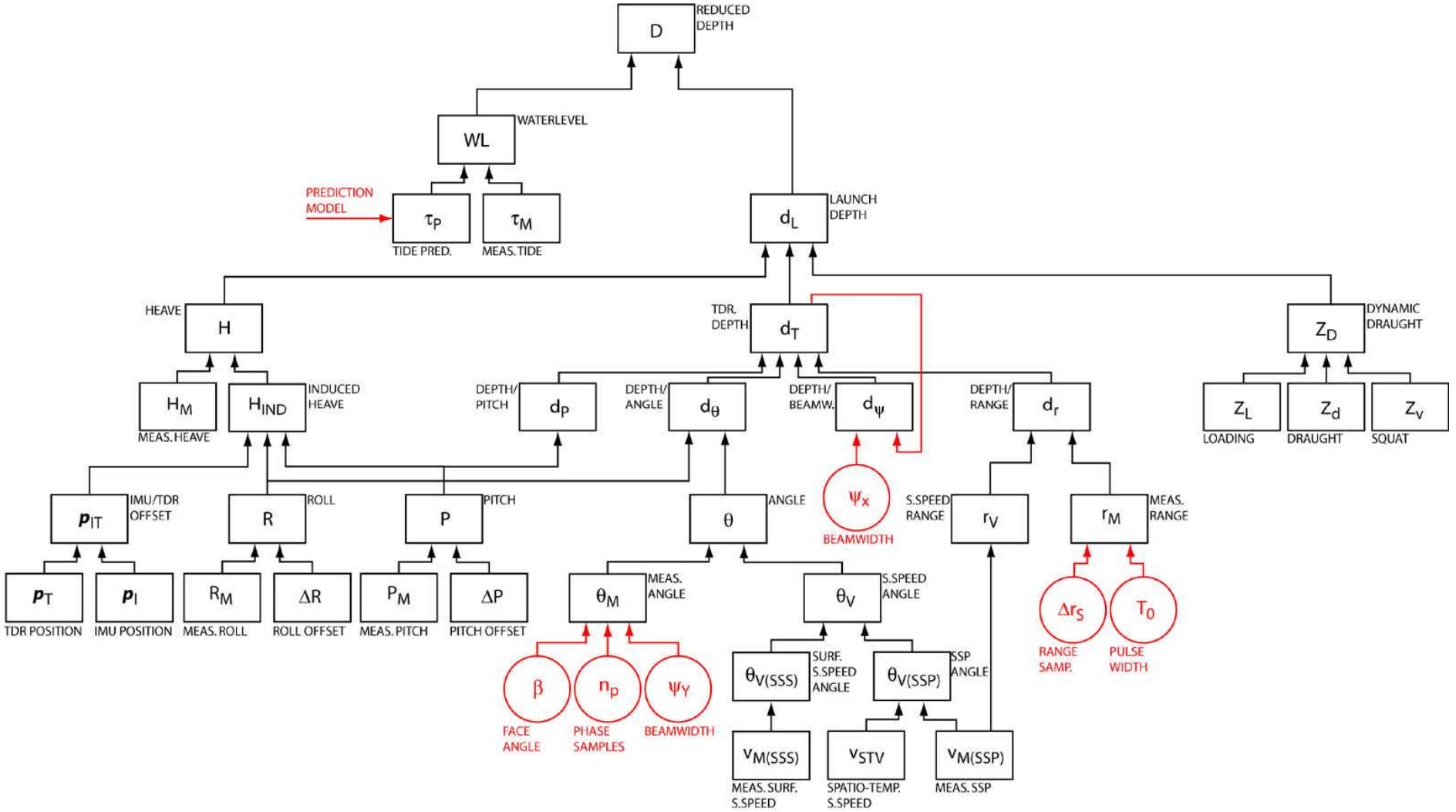
Hydrographic Processing Can Be Hard

- It's true. Even for experienced users.
- Mistakes happen. Safeguards catch them. Mistakes are fixed, sometimes at great cost.
- But it happens again, project after project



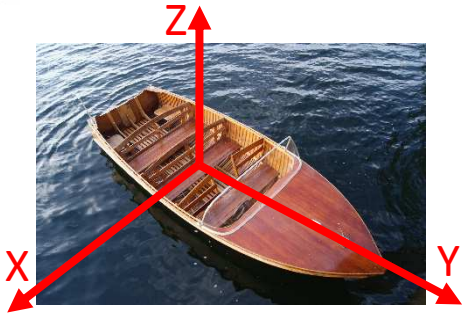
Many of the frustrations are due to the fact that the human operator must connect all the pieces together to come up with the final processing solution



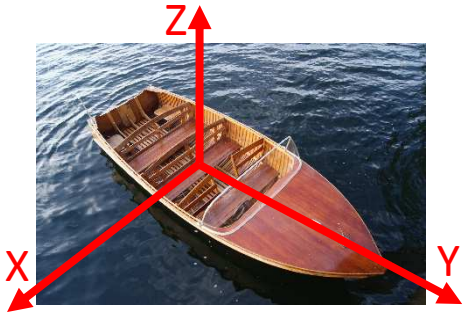


Slide courtesy of Dr. Brian Calder (UNH)

Sources of Human Error

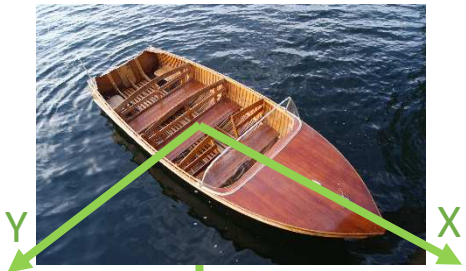


QINSy & Qimera

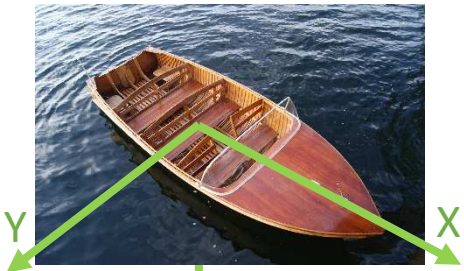


Reson (.s7k, PDS2000)

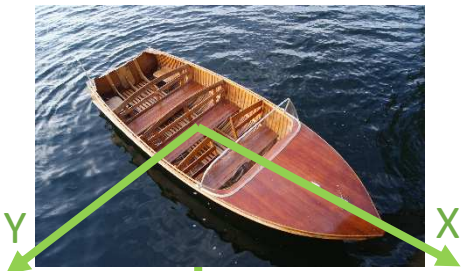
Typos when transcribing vessel configurations from one software application to another or from one coordinate frame convention to another



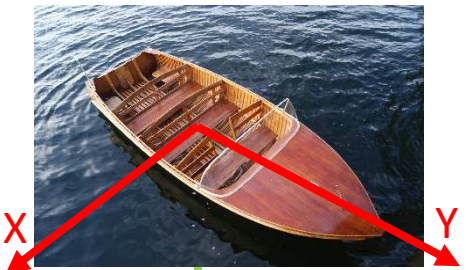
GSF (.gsf)



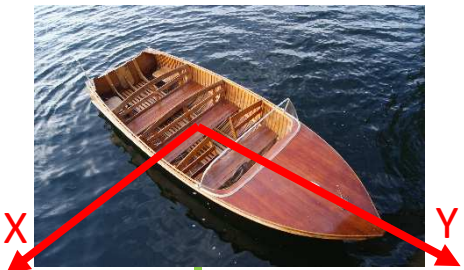
Kongsberg (.all)



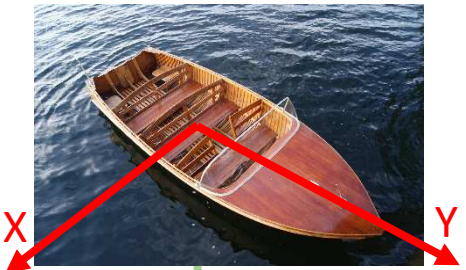
Applanix (.000 and SBET)



Hypack (.hsx)



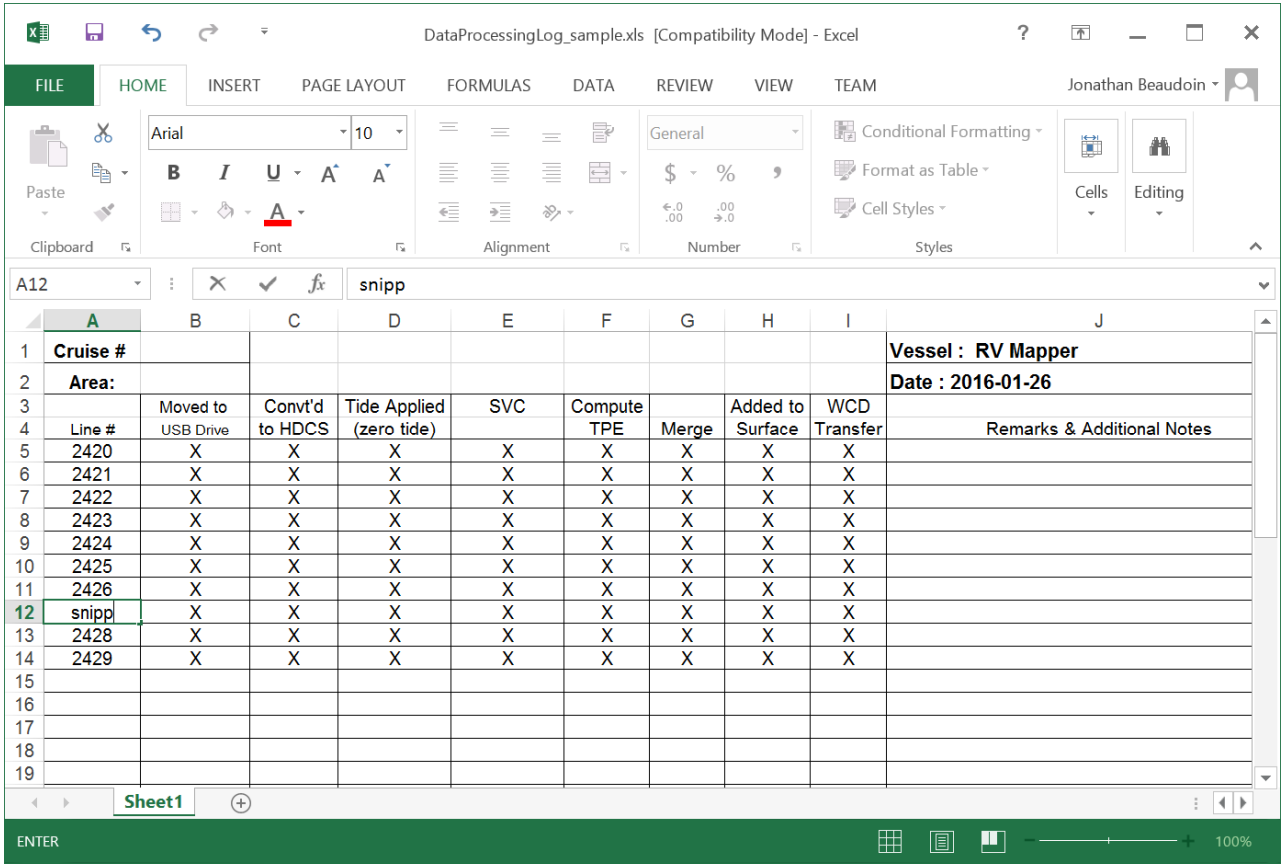
XTF (.xtf)



Caris (HIPS)

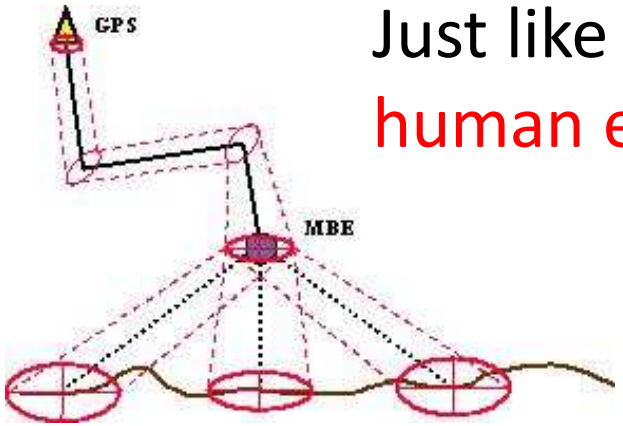
Sources of Human Error

- Importing ancillary data and then failing to apply it to the correct data files
- Changing processing configurations and not then triggering the appropriate reprocessing
- Not triggering the appropriate reprocessing for files that need it



	A	B	C	D	E	F	G	H	I	J
1	**Cruise #**									**Vessel : RV Mapper**
2	**Area:**									**Date : 2016-01-26**
3		Moved to	Convt'd	Tide Applied	SVC	Compute		Added to	WCD	
4	Line #	USB Drive	to HDCS	(zero tide)		TPE	Merge	Surface	Transfer	Remarks & Additional Notes
5	2420	X	X	X	X	X	X	X	X	
6	2421	X	X	X	X	X	X	X	X	
7	2422	X	X	X	X	X	X	X	X	
8	2423	X	X	X	X	X	X	X	X	
9	2424	X	X	X	X	X	X	X	X	
10	2425	X	X	X	X	X	X	X	X	
11	2426	X	X	X	X	X	X	X	X	
12	snipp	X	X	X	X	X	X	X	X	
13	2428	X	X	X	X	X	X	X	X	
14	2429	X	X	X	X	X	X	X	X	
15										
16										
17										
18										
19										

What's the Cost?



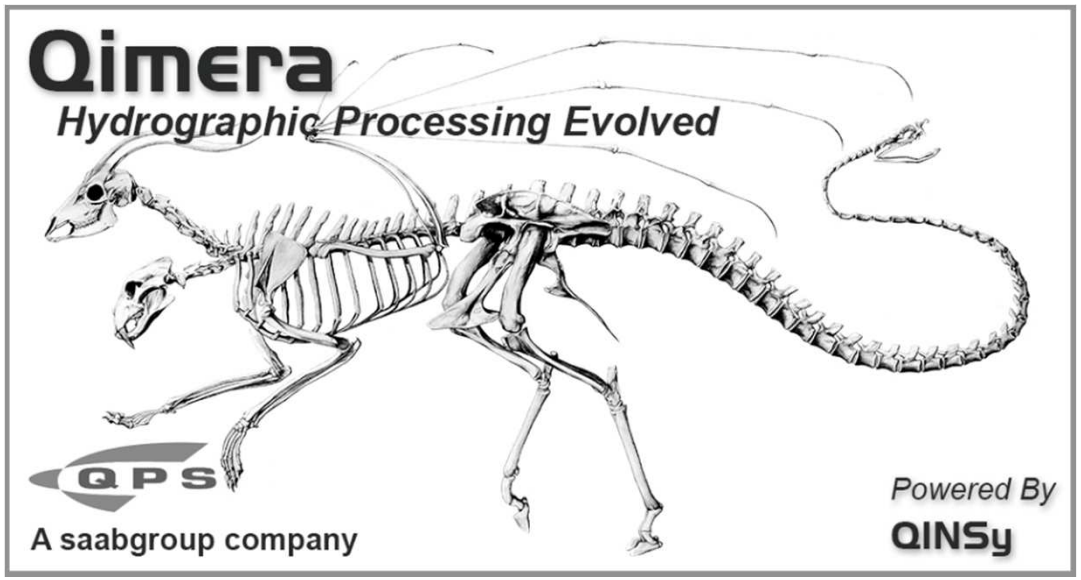
Just like total propagated uncertainty (TPU), human error can compound with each mistake

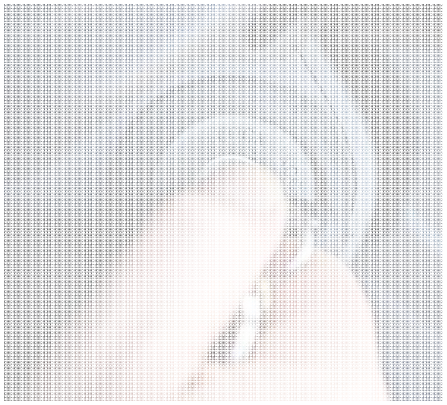
Potential Outcome #1

You may have great measurements but your output deliverables may not reflect that.

Potential Outcome #2

You may have a great result, but it took a long time, a lot of people or a lot of $$$ to get to it





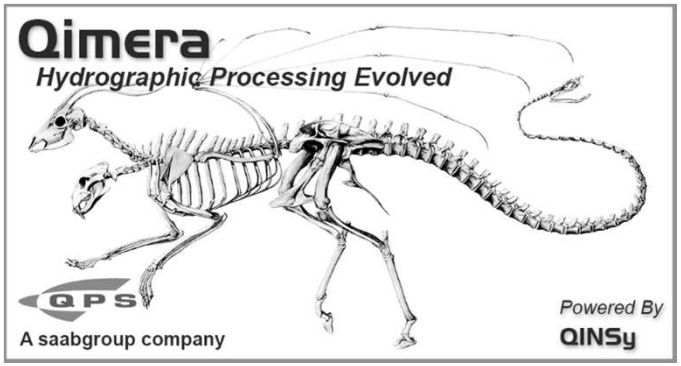
SAAB
Defence and Security

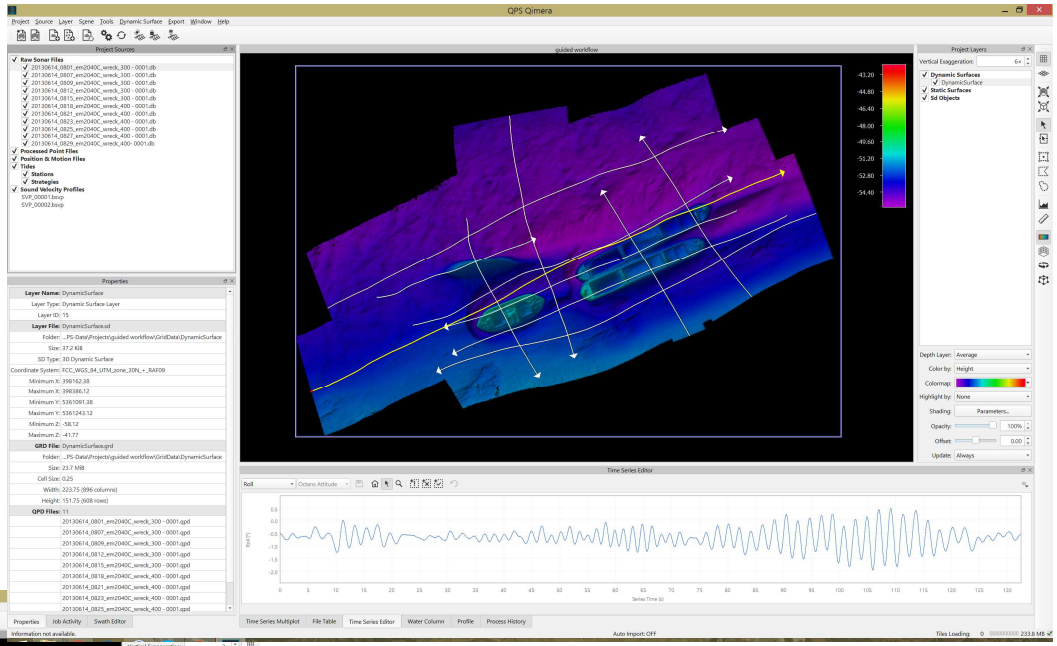
Qimera?

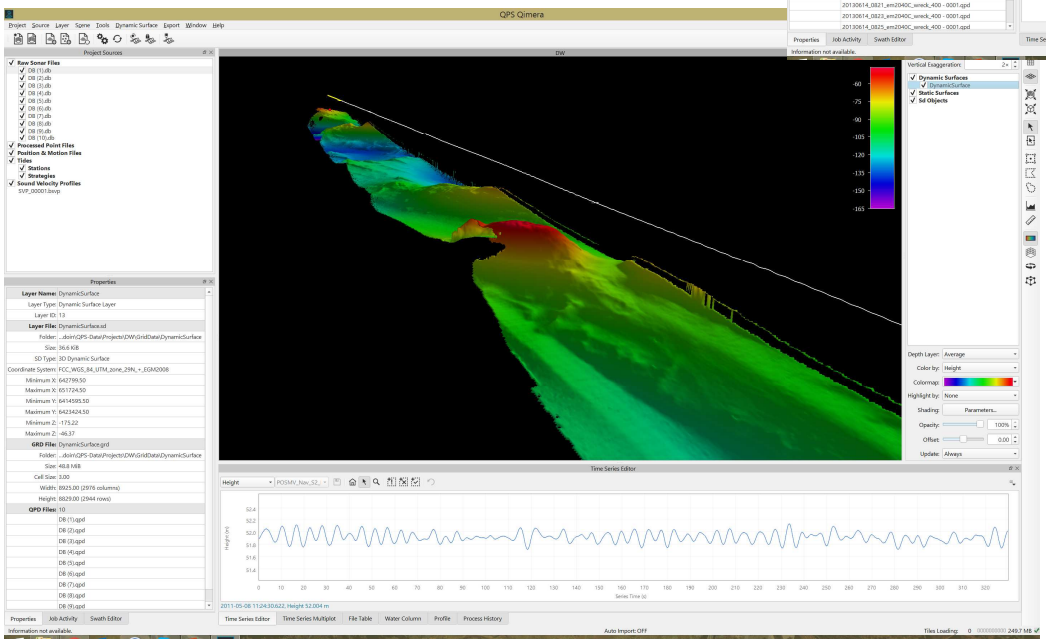
The Chimera was, according to Greek mythology, a monstrous fire-breathing hybrid creature of Lycia in Asia Minor, composed of the parts of more than one animal.

It is usually depicted as a lion, with the head of a goat arising from its back, and a tail that might end with a snake's head. *(Wikipedia)*

- The Lion: QINSy Hydrographic Engine
- The Goat: Fledermaus 4D Visualization Engine
- The Snake: FMGT and FM Midwater Multi-Core Engine







Performs complete hydrographic processing for most modern sonar formats: .db, .all, .s7k, .hsx, .jsf, .gsf

Many ancillary formats are supported: SBET, PosPac, most tide and SVP

Exports include GSF, FAU, BAG, Arc and other image formats

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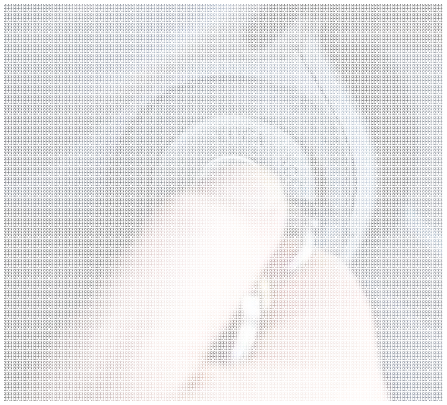
Qimera Innovations

- Automate the mundane and error prone tasks for which computers are well suited but humans are not, for example:
  - Transcription automation
  - Processing state management
- Isolates the stages for which a human brings value to the process, for example:
  - Data validation: knowing good data from bad
  - Processing configuration management: managing the “recipe”, not the process, to get the results you want
  - Troubleshooting: identifying causes of errors

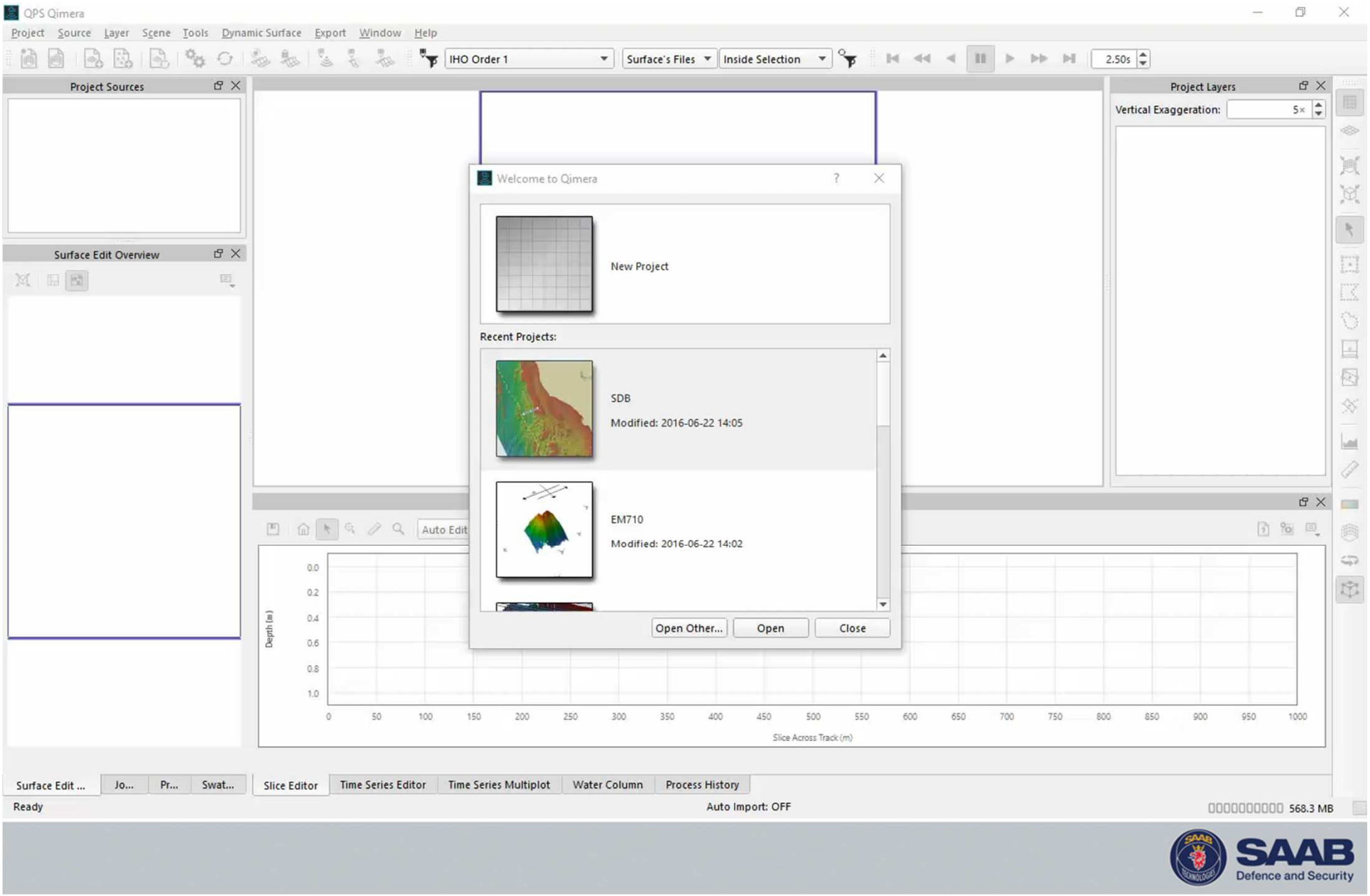
Qimera Innovations

- Guided Workflow
  - Let non-expert users arrive at typical bathymetric deliverables with little training or expert knowledge
- Dynamic Workflow
  - Processing State Management: Codify and manage the relationships between observations and results
  - You don't need to remember **what** processing needs to be done, just that **some** processing must be done



Guided Workflow?

Demo #1: Guided Workflow

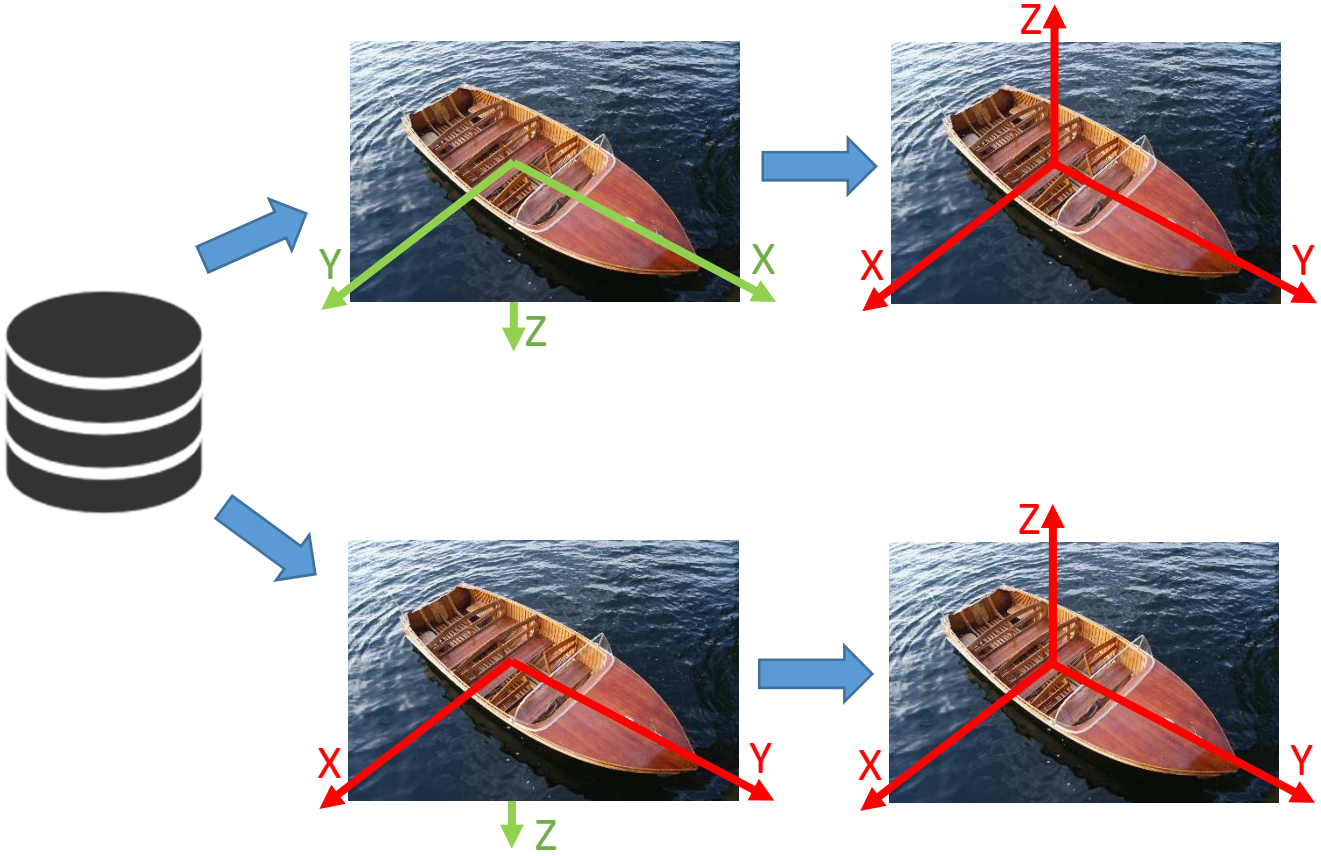


Transcription Automation

Most modern formats can contain:

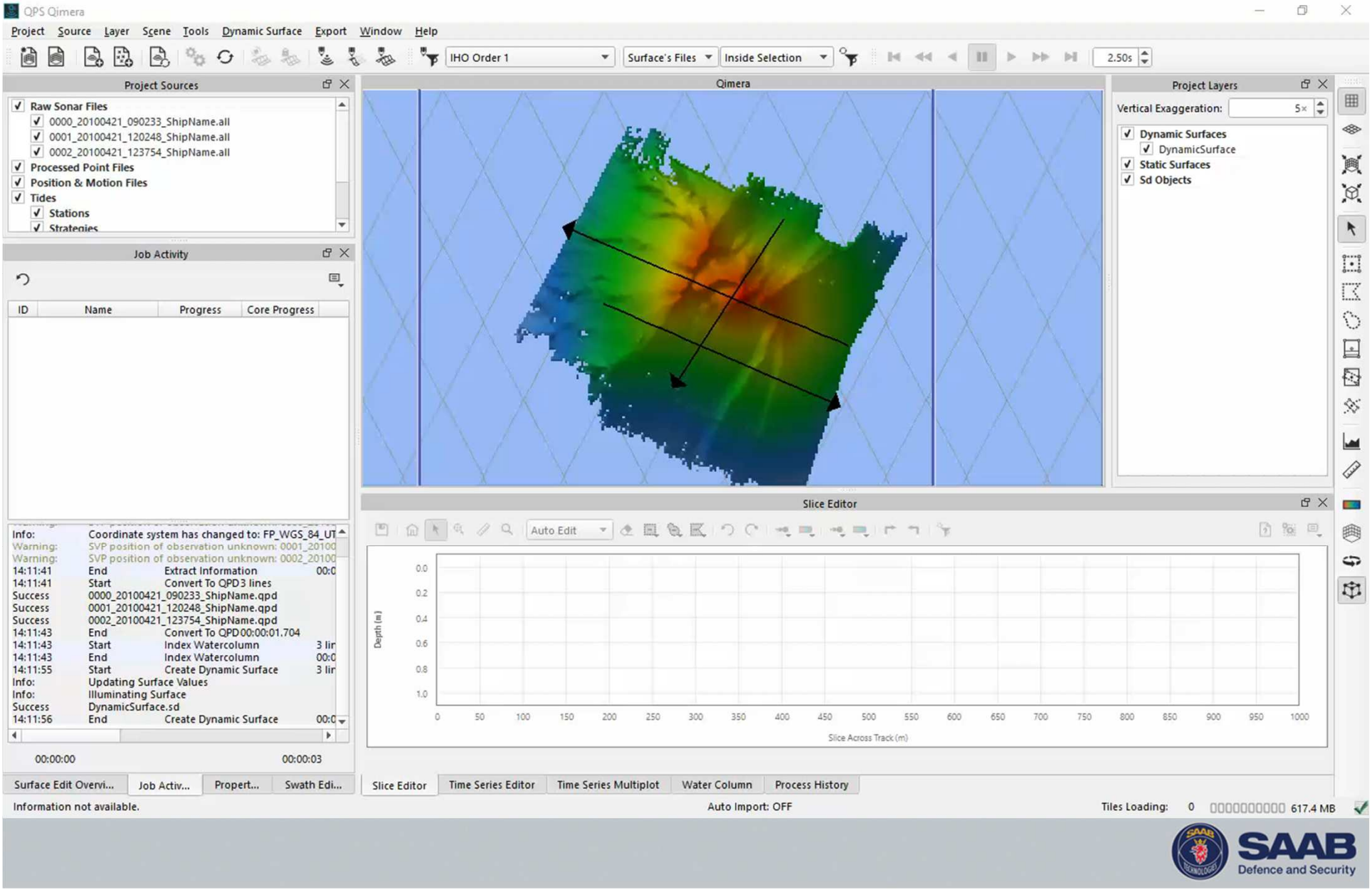
- Vessel configuration
- SVP
- Tide
- Processing configuration (e.g. tide vs GPS height)

Qimera extracts all of this information and configures the appropriate processing configuration for you.



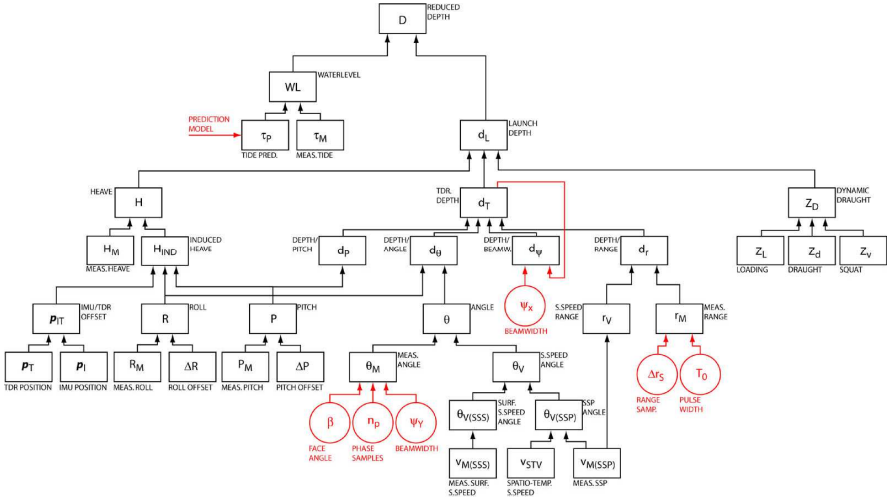
With well a correctly configured acquisition system, post-processing is very simple. You can get straight to work doing validation.

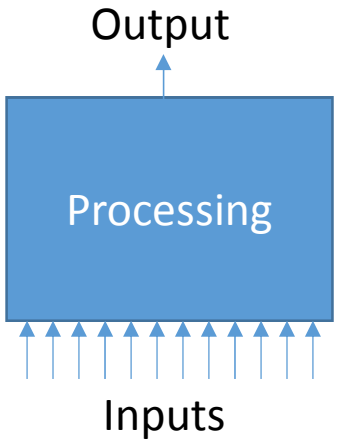
Demo #2: Automating Transcription



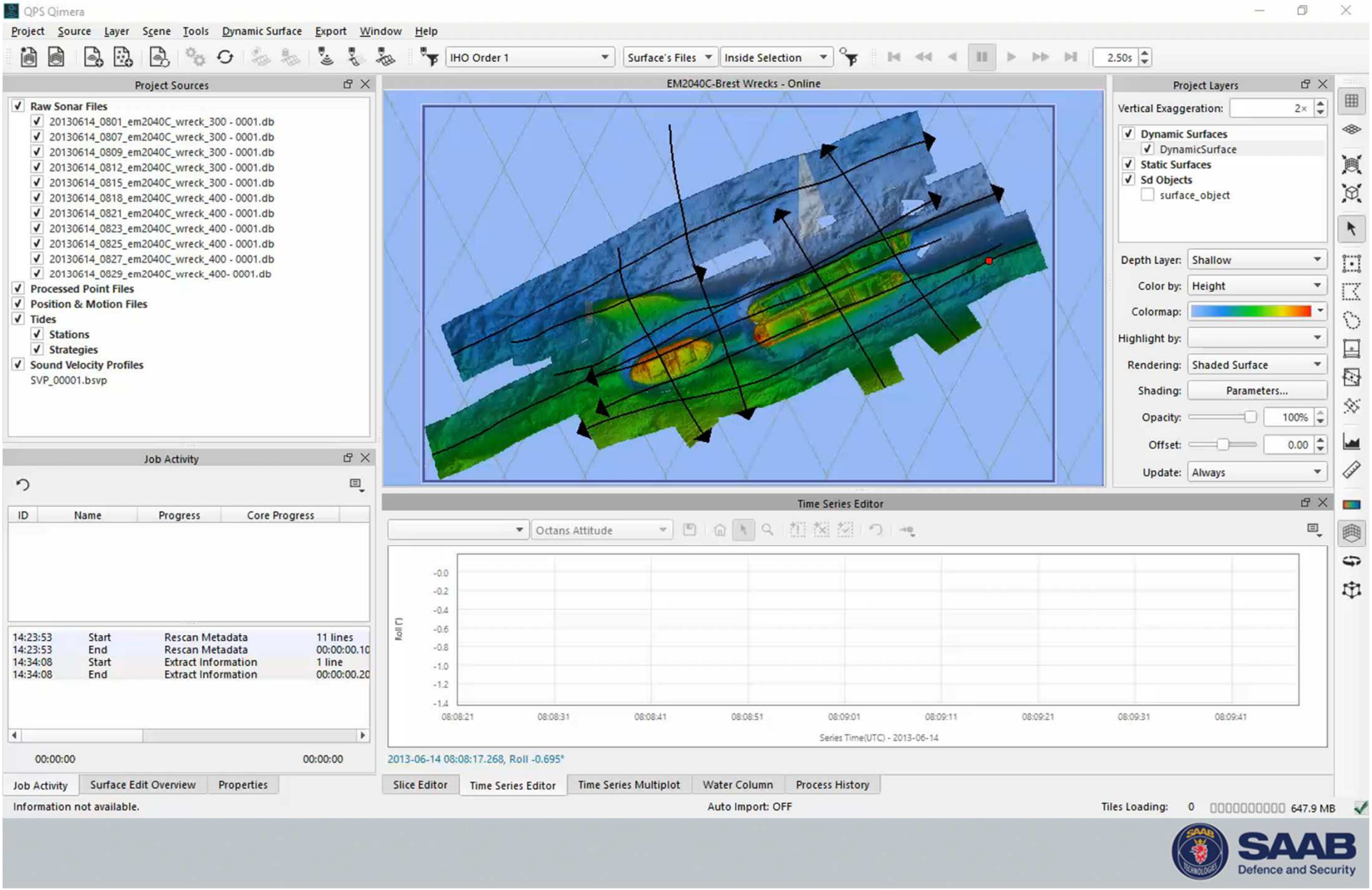
Processing State Management

- Coupling of Action and Effect: This should be an atomic and indivisible task
- You cannot make changes without updating output (you can delay the update, but we make sure you don’t forget)





Demo #3: Processing State Management



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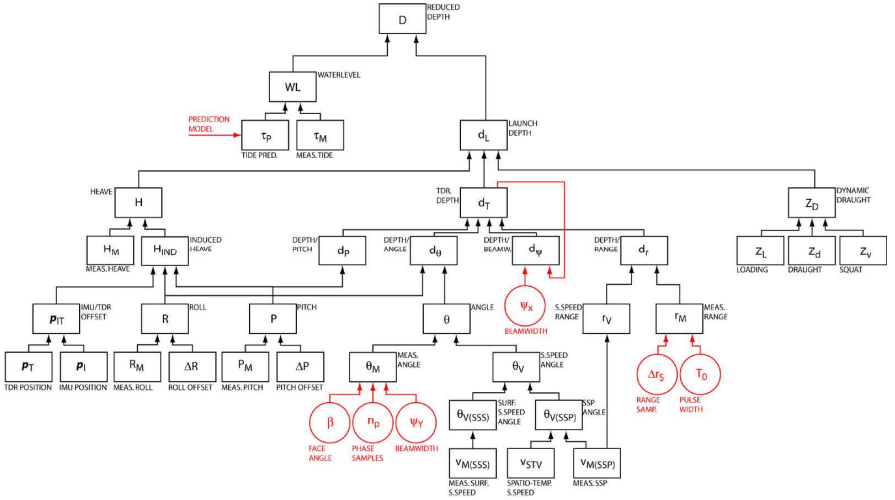
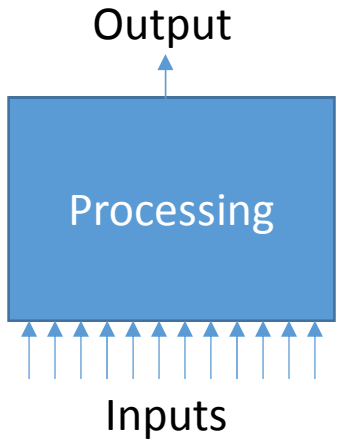
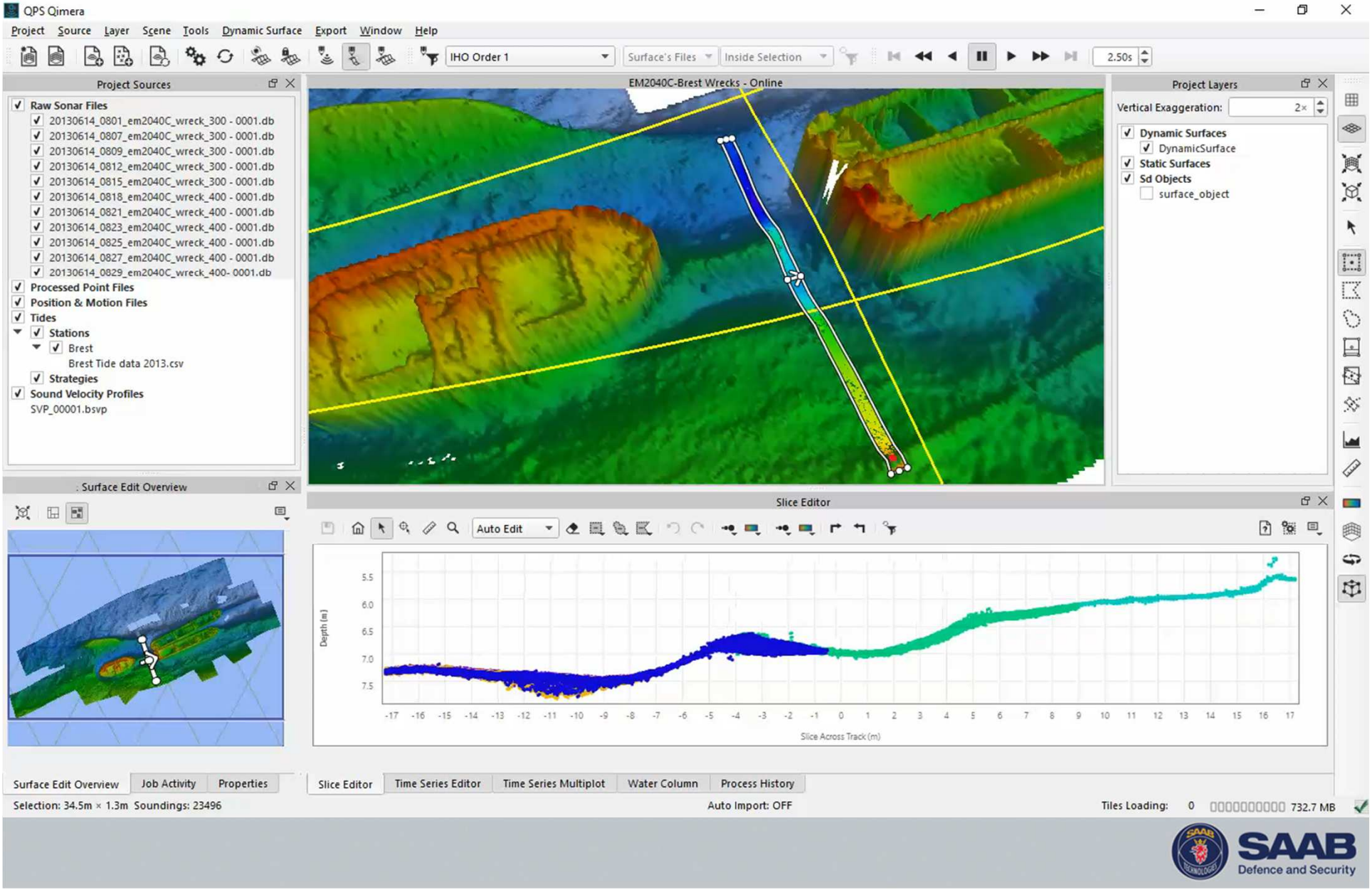
Dynamic Workflow

- “Live” processing state management
- It is easy to make processing configuration adjustments or to perform data validation and to immediately assess the impacts of changes
- Near immediate feedback shortens time between cause and effect
- This promotes causal reasoning, a key ingredient for natural human learning processes
- It allows users to train themselves





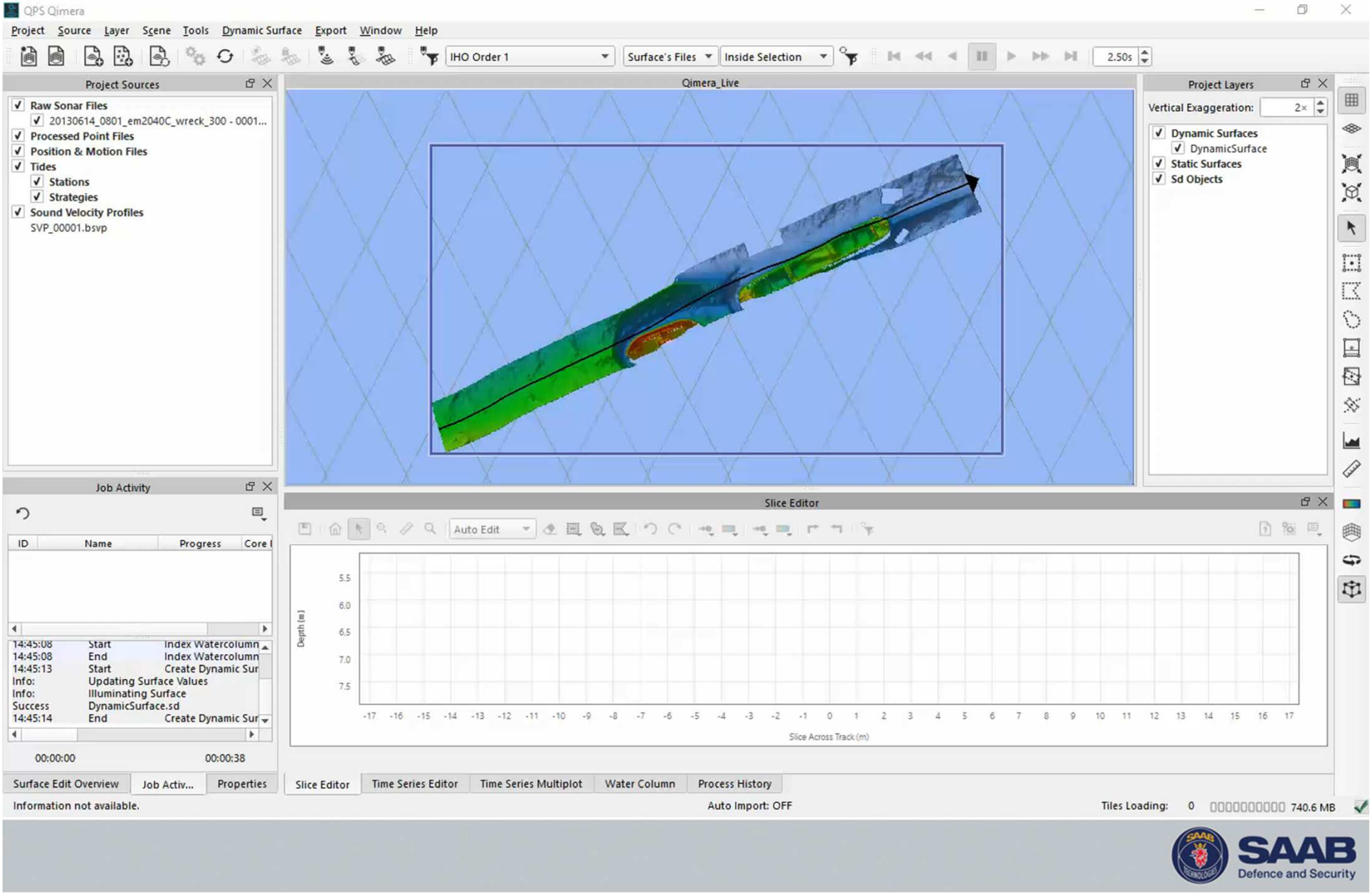
Demo #4: Dynamic Workflow



Bringing Post-Processing to a Real-Time Environment

- If much of post-processing can be automated, there is benefit to it being done in near real-time, or “just-in-time”
- Qimera Live gives you a 2nd opinion on your data quality during acquisition
- You can get to work on validation if you want
- Why wait to get to the office to be surprised by a misconfiguration of your acquisition system?

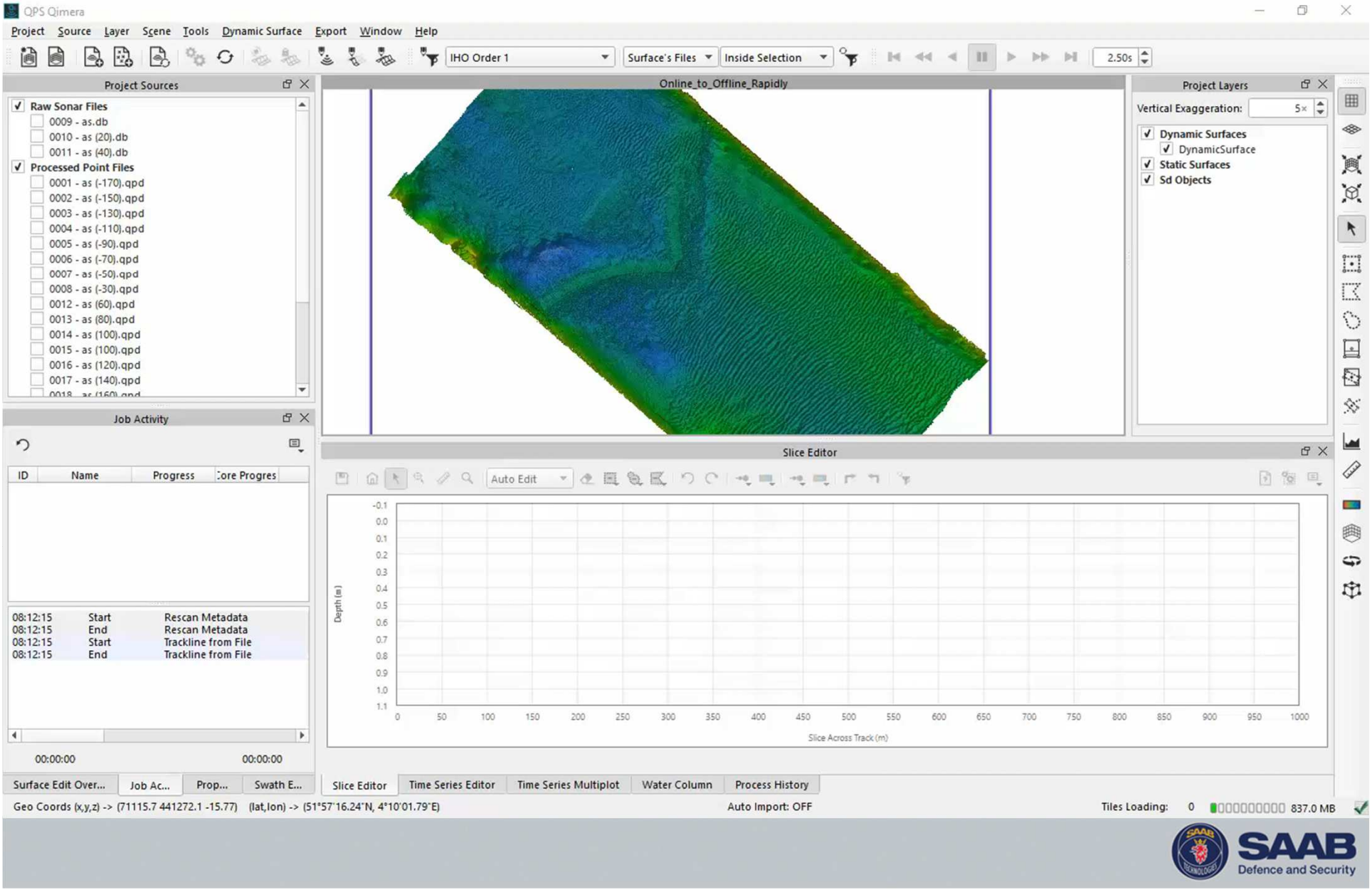
Demo #5: Qimera Live



Dynamic Workflow for Validation

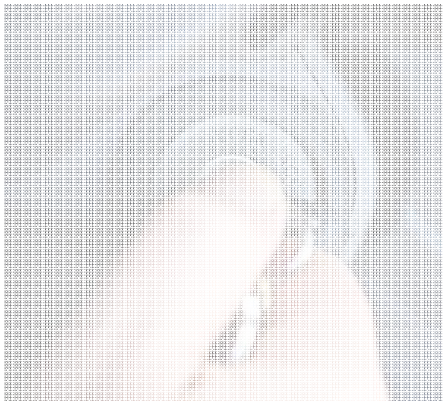
For data validation to be effective, you need immediate feedback on what you're doing. Dynamic Workflow connects validation to grids and lets you validate with confidence.

Demo #6:
Dynamic Workflow for Validation



Summary

- Qimera provides an innovative user experience through several key design features:
  - Guided Workflow
  - Transcription Automation
  - Processing State Management
  - Dynamic Workflow for Processing
  - Real-Time QA
  - Dynamic Workflow for Validation
- Qimera Reduces
  - Human Error
  - QA burden
  - Knowledge barrier to entry
  - Training costs
- Qimera Improves
  - Processing Outcomes
  - Post-Processing Times
  - Data Validation Results



Questions?

Software Solutions for the Maritime Community

QINSy
hydrographic survey and positioning system

Qimera
hydrographic data processing

Fledermaus
visualisation and analysis

Qarto
ENC production

Qastor
navigation and docking system

Connect
maritime data distribution system