



Monterey Bay Aquarium  
Research Institute

## **Introducing the R/V *David Packard* through Animation**

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**Blender**

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### **ABSTRACT**

MBARI plans to retire its flagship research vessel, the R/V *Western Flyer* in 2022. Taking its place will be the R/V *David Packard*, a state-of-the-art vessel capable of embarking on a variety of missions in Monterey Bay and beyond. In preparation for this transition, I created a computer-generated animation showcasing the capabilities of the new vessel and how it will interact with existing MBARI technology to advance our understanding of the ocean. The animation was posted on MBARI's various social media channels, where its analytics were tracked to assess the video as a communication tool for the R/V *David Packard*.

### **INTRODUCTION**

The R/V *Western Flyer* has been MBARI's flagship research vessel for over 25 years. It has played a critical role in advancing our understanding of the ocean and

bringing marine science to global audiences. With the retirement of the R/V *Western Flyer* approaching in fall of 2022, MBARI is in the process of shifting operations to their new research vessel, the R/V *David Packard*. The *David Packard* will take the place of the *Western Flyer* in MBARI's fleet as their flagship vessel. It will continue and expand the *Western Flyer's* work mapping Sur Ridge, departing on expeditions throughout the Pacific Ocean, and serving as the command center for MBARI's remotely operated vehicle (ROV) *Doc Ricketts*.

The R/V *David Packard* is currently planned to reach operational status in late 2023. While construction has already begun, there is still a significant amount of time before the R/V *David Packard* will be ready to depart on research expeditions. This period of transition is a great opportunity for building public excitement and engagement to ensure a strong welcome of the new vessel. Leveraging MBARI's online presence on social media platforms can be useful in reaching a large public audience and expanding MBARI's library of content around technology. Here, I created a computer-generated animation featuring the R/V *David Packard* to showcase the new vessel and demonstrate the variety of roles it will fulfill as MBARI begins its next chapter in ocean exploration.

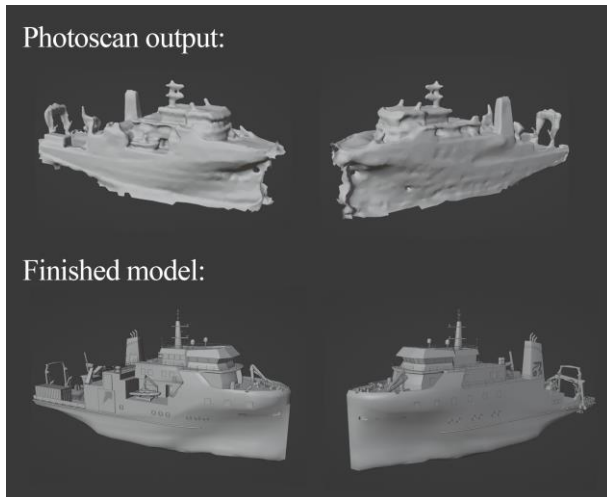
## **VIDEO PRODUCTION**

The 3D assets featured in this video were created and rendered in Blender. Blender is an open-source 3D animation software with a built-in path-based rendering engine. Rendered shots were edited and composited in Adobe Premiere.

## **REFERENCE AND MODELLING**

The modelling process of the R/V *David Packard* involved several rounds of revision to accurately recreate the vessel in 3D. Because the only available images of the R/V *David Packard* were renders provided by Glosten, there were several angles and parts of the ship's exterior that were not visible among this limited selection of images.

Glosten did provide MBARI with a virtual reality tour of the R/V *David Packard* in 2019, which was instrumental in the modelling phase. The 3D model running in the virtual reality tour file could not be extracted directly, but the VR tour did allow for free rotation of the ship's exterior. Not only did this enable reference from any angle, but I



**Figure 1: Photoscan and refinement of the 3D R/V *David Packard***

The rudimentary 3D photogrammetry output from Agisoft Metashape of the R/V *David Packard* (top) served as reference for basic form and proportions for the final model (bottom).

was able to generate a 3D base using images of the VR model processed through Agisoft Metashape, a photogrammetry software (Figure 1).

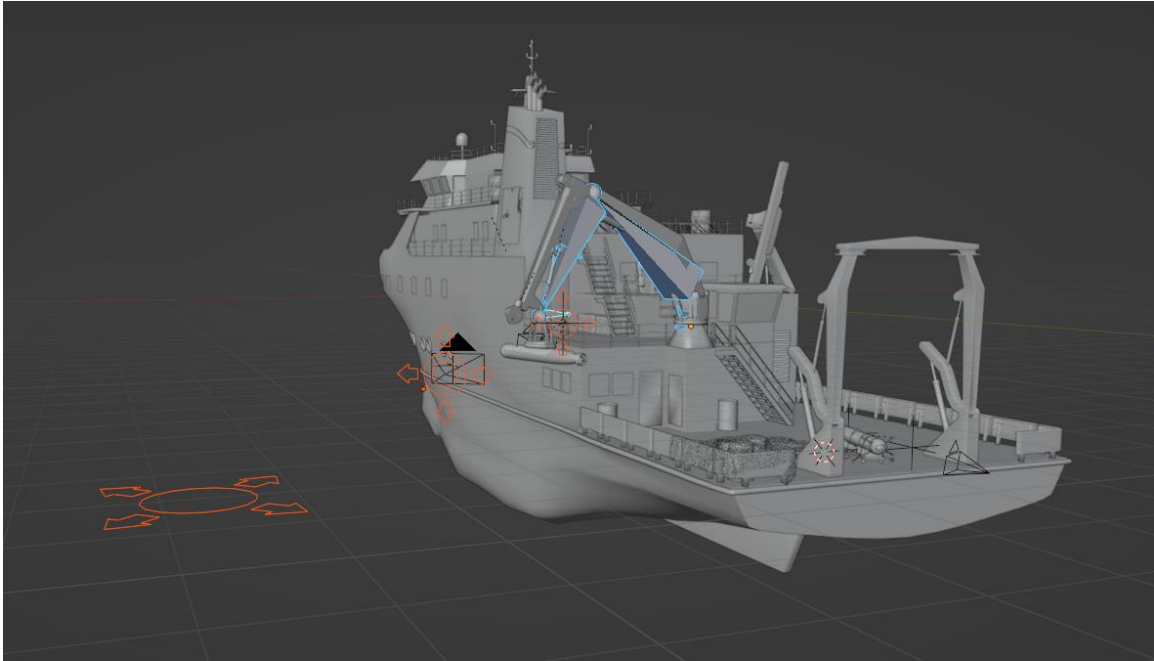
From this 3D base, I was able to manually model the ship with accurate proportions and scale much more easily than if I were to only use 2D images as reference. However, because the VR tour model was created in 2019, there were several changes to the ship's design that were not accounted for in the first several drafts of the 3D vessel.

Further consultation with MBARI staff and engineers was needed to resolve these inconsistencies and complete the model.

## ANIMATION AND COMPOSITION

Animation of the R/V *David Packard*, ROV *Doc Ricketts*, and AUVs was done natively inside Blender. The nature of the video production demanded for basic movements of the objects in each scene, so simple keyframe animation of each object was sufficient. More complex movement rigs were only used for the R/V *David Packard's* cranes and to replicate cinematic camera motion (Figure 2).

Developing and composing the shots of the animation proved to be more difficult than anticipated, largely due to the commitment to realism and scientific accuracy. Stylistically, this demanded near-photorealistic materials, models, and lighting, as well as realistic motion of cameras, vehicles, and water. More challenging, however, was finding ways to direct the cinematography to create visually interesting shots within these constraints. This influenced which 3D elements could be included in specific scenes, as well as the construction of each environment. Each design decision changed the way that shots were framed and animated, prompting creative problem-solving for every shot.



**Figure 2: Movement rigs used for object and camera animation**

A custom movement rig (blue) was constructed to animate the motion of a crane on the R/V *David Packard* deploying an AUV. A dolly movement rig (orange) was used to replicate common camera motions used in film and television.

Several rounds of review and revisions from MBARI staff were essential in adhering to the scientific accuracy of each shot.

## SCRIPT AND VOICEOVER RECORDING

The development of the script was the most collaborative portion of this project. The script was written to align with MBARI's past materials around the R/V *David Packard* and underwent a lengthy editing process to deliver MBARI's messages around technology and ocean science in an accessible way. The script played a large role in achieving the goals of this animation, namely describing the ways the R/V *David Packard* will interact with other technology and affect future research at MBARI.

Further revision of the script occurred while recording the voiceover. Small changes for brevity and flow were important for improving the sound of the voiceover track. Speed, cadence, and clarity in the delivery were also important for making the voiceover as accessible as possible. Voiceover recording also had to be timed to match the approximate length of each shot of the animation. Because rendering additional frames had a great time cost, it was important to cut out unnecessary words to maintain a

comfortable speaking speed. The balance of all these factors proved to be somewhat challenging, although the final voiceover track was able to meet these needs.

## **PUBLIC RECEPTION**

The finished animation was posted to MBARI's YouTube channel on August 3<sup>rd</sup>, 2022. Separate posts about the animation were also created for MBARI's Instagram, Facebook, Twitter, LinkedIn, and Tumblr accounts. These posts included additional information about the R/V *David Packard* and linked to the animation on MBARI's YouTube page.

## **VIEWS AND ENGAGEMENT**

As of August 9<sup>th</sup>, 2022, the animation received 21,265 total views across all platforms. Instagram was the largest portion of these, reaching 14,493 views. Instagram also had the largest number of engagements (likes, comments, and shares) with over 1,000. Twitter and YouTube had similar view counts to each other, with 2,068 and 2,521, respectively. These views will steadily rise for the next few weeks as the animation continues to be shared online.

The animation had a wide geographic reach within the first week it was uploaded. On YouTube, 50.5% of views came from users in the United States, with the rest coming from countries across the world like Canada, the United Kingdom, Russia, and India. Geographical analytics were unavailable for the other platforms but are likely comparable in distribution.

## **FUTURE USE**

This animation is one component of a larger promotional campaign to welcome the R/V *David Packard* to MBARI's fleet of research vessels. As such, it will be distributed again as MBARI prepares for the vessel's arrival. MBARI plans to use the animation to share details about the vessel in future interactions with external media outlets and in updates on the progress of the ship's construction. Each of these uses will likely boost views and engagement on the animation and spread it to wider audiences.

## CONCLUSION

The R/V *David Packard* animation will be a useful tool for future communications surrounding MBARI's new research vessel. Creating the animation posed some technical obstacles and creative challenges, but the final video found a balance between scientific accuracy and artistic vision. As MBARI prepares for the arrival of the R/V *David Packard* in 2023, this animation will continue to engage the public and spark interest in the technology that allows us to understand our changing ocean.

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