



# Seeing Clearly:

## Telescope Assembly Instruction Redesign

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### Problem

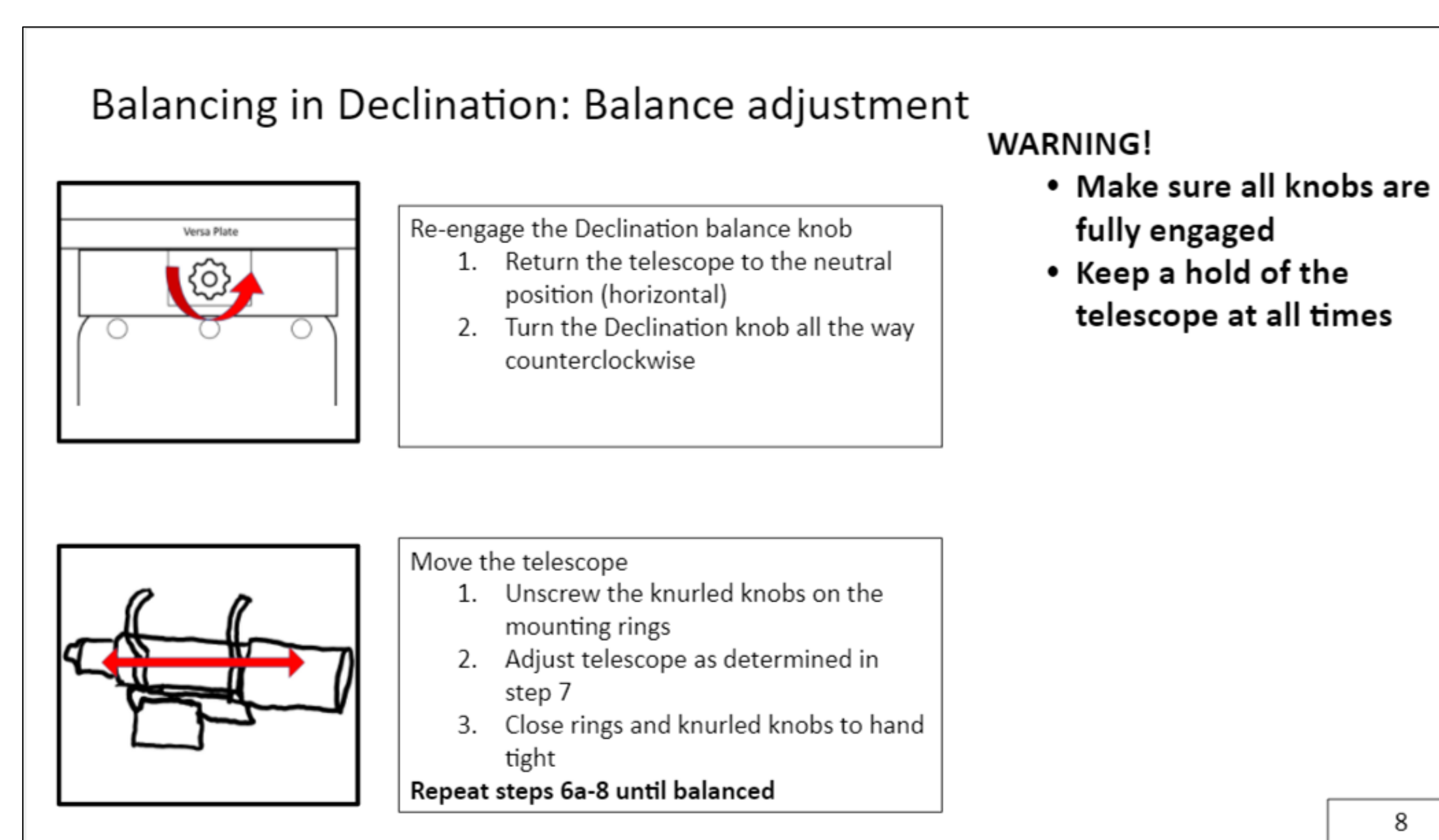
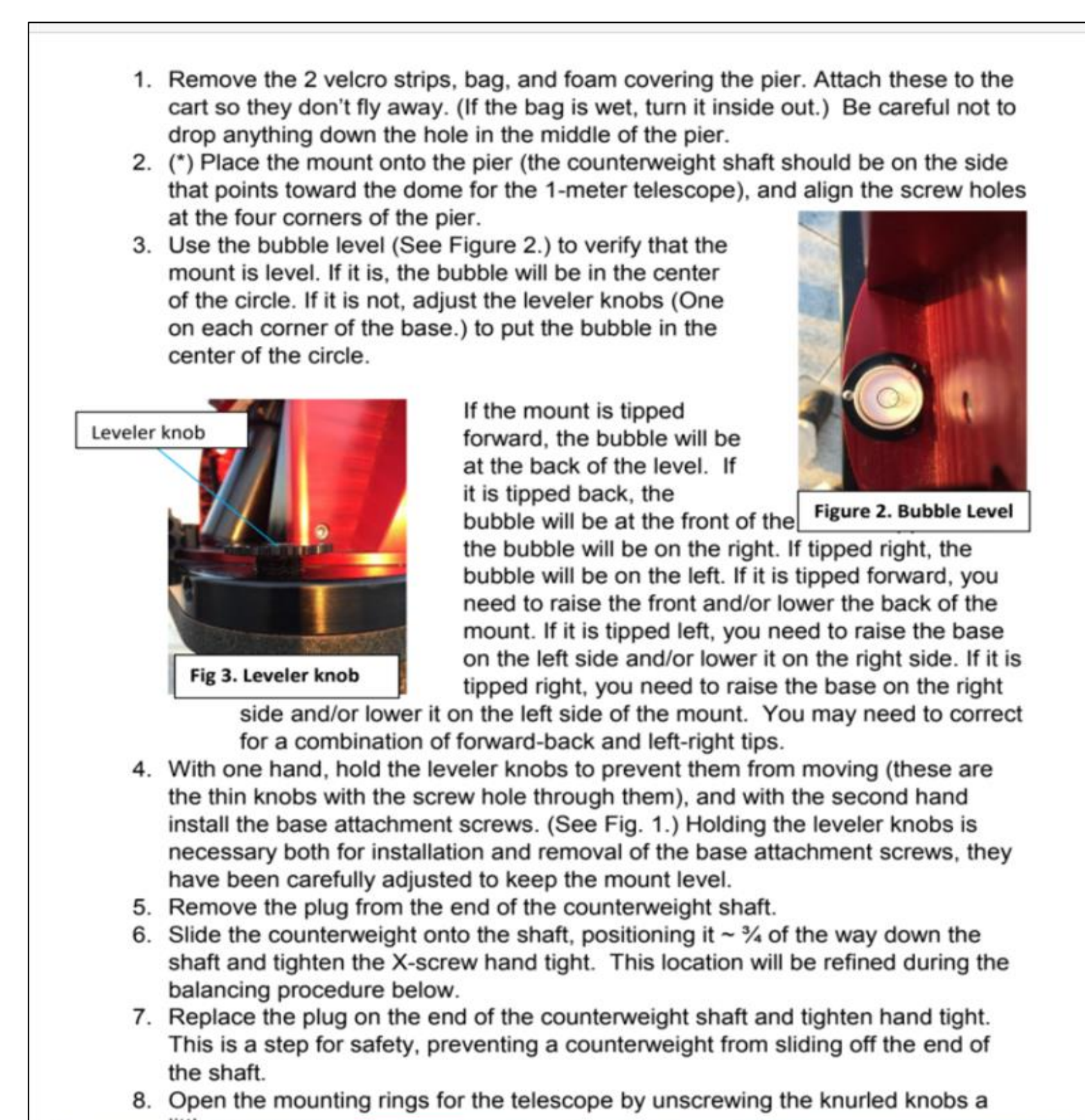
The astronomy department teaches the assembly and use of large 60+ lbs telescopes during their labs, and as such has an instruction manual to assist in the process. However feedback from students and teaching staff indicated that the instruction manual was text-heavy and could be clearer and more understandable. This project aimed redesign the manual using human factor principles such as:

- Consistency -- in both wording and style
- Limiting volume of text -- too much overwhelms the user
- Feedback -- telling users what to expect when the step is complete
- Additional images -- there was confusion over what parts were what

### Development of Template

- We talked to students to find what features they wanted in instructions and looked at research to see what human factor principles were suggested
- We then conducted a task analysis to determine what information had to be included and how to break each step into smaller chunks. An error analysis informed what warnings were needed and at which steps
- While we created multiple prototypes, we settled on one to clearly showing images and instructions for individual steps without being crowded (Bottom image)
- Preliminary analysis showed that users liked the number of images and short command statements

**Abstract:**The ME telescopes are over 60 lb mounts that must be secured to permanent piers that have been cemented onto the roof of COAS. The astronomy students have to learn to assemble these telescopes during their labs each semester. We have been working in tandem with the astronomy department to simplify their assembly manuals for the ME, Mx, and Mx+ telescopes. Feedback from ERAU students indicated that they were struggling to clearly understand the assembly process and reported the current instruction set to be cumbersome to use. Through a review of human factors and educational literature, a set of best practices was developed to create a template for a new instruction set that breaks down each step and pairs it with two images per page. The language was simplified into bulleted direct command statements rather than paragraphs. Once the ME manual was completed, we ran a pilot study where two teaching assistants and a professor walked through the manual during assembly. Currently we are making the necessary changes based on the pilot. The next steps will be to conduct a full usability study with naive students and to apply the template to the other telescope models.



TOP: Old manual design  
BOTTOM: Revised manual design

### Iterative Process

- Once we chose a template, a full set of instructions was created
- The manual was piloted with 2 teaching assistants and a professor where they walked through the manual while assembling the telescopes. We recorded their thoughts and comments on the manual, which were then used to identify necessary changes.
- We are currently making those changes including bolding some text, clarifying images, changing wording, and adding text.
- After changes are complete, the manual will be reviewed and then tested again to make sure issues were all addressed.

### Planned Evaluation

For future evaluations we will have students from the astronomy department test out the new instruction template with the telescopes. We will conduct a usability test and run through tasks to evaluate the template. We will then be able to further improve the template and implement it to other telescope models. Using this format will be beneficial for students as it makes it easier for them to complete the assembly process and provides visuals they can match to the telescope.

