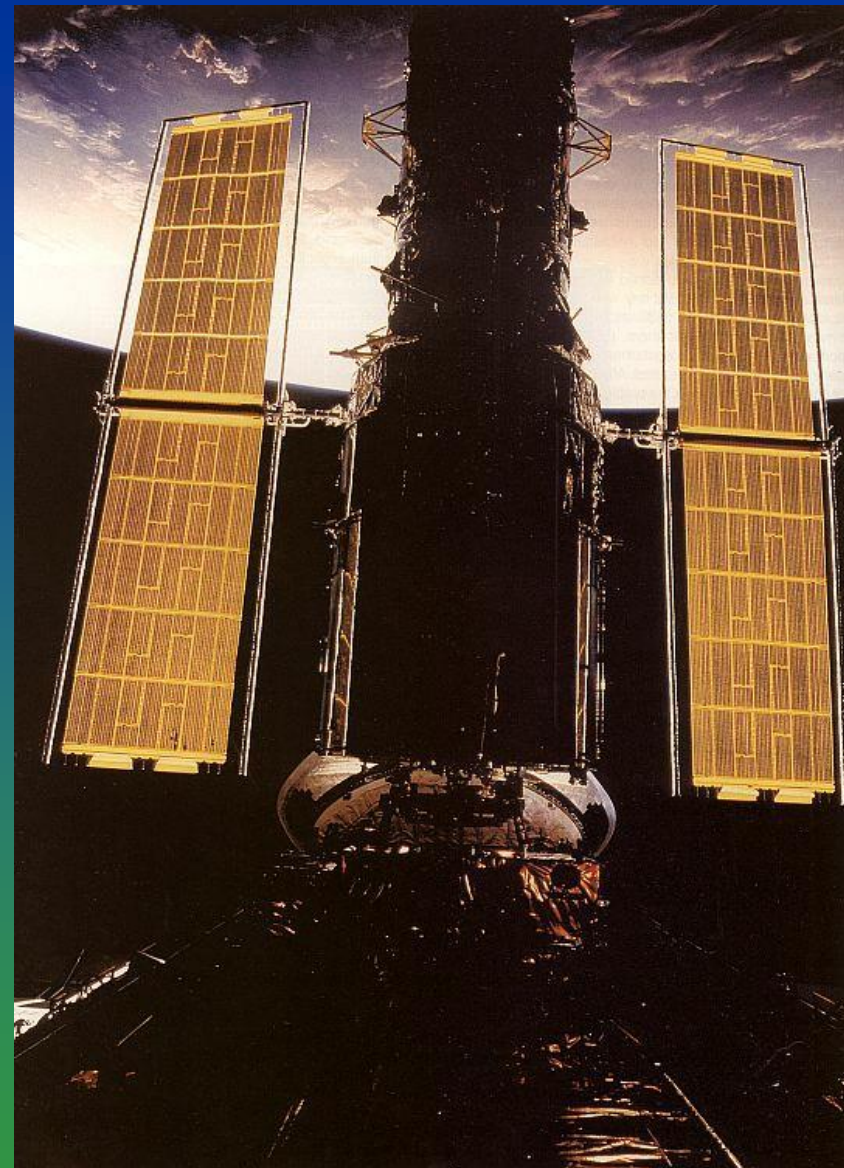


# *Application of RecurDyn/FFlex to Space Structures*



# Summary

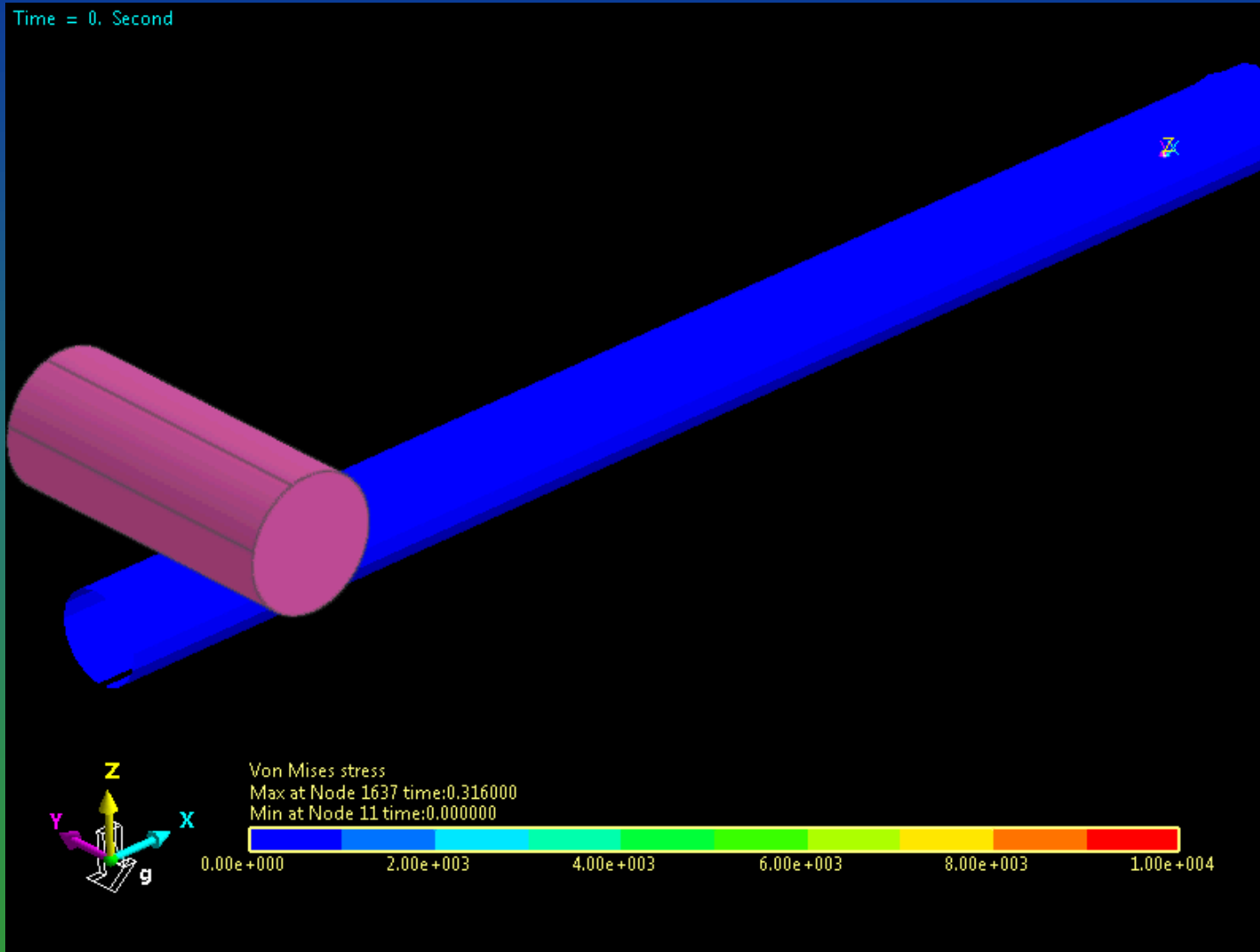
- The deployment of certain space structures involve the combination of large deformations in flexible bodies and significant motions of other components in the assembly.
- One example is deployable solar arrays, such as the arrays of the Hubble telescope as shown in the figure.
- Nonlinear FEA software can have convergence problems in simulating the deployment of such structures, and the run time can be long.
- RecurDyn/FFlex has excellent robustness and faster simulation times for these structures.
- The following slides contain animations of a sample simulation.



[nssdc.gsfc.nasa.gov/image/spacecraft/hst\\_refurb2.jpg](https://nssdc.gsfc.nasa.gov/image/spacecraft/hst_refurb2.jpg)



# Forming the Tube to the Mandrel

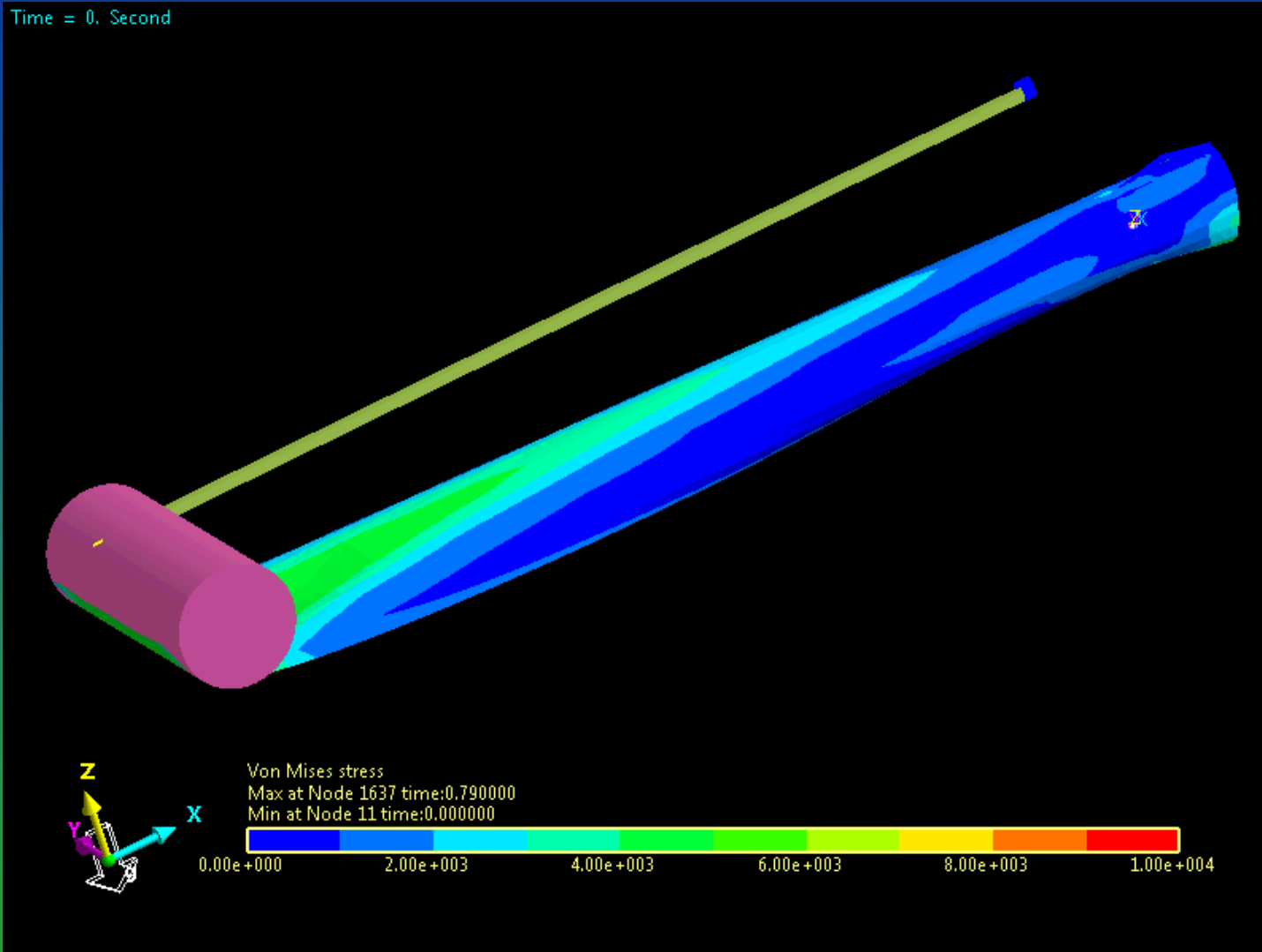


On\_Mandrel\_Top Iso.avi

# Rolling Up the Tube



Time = 0. Second



Roll\_Up\_TopIso.avi



# Results



- Simulation of the tube with RecurDyn executed in ~5 minutes as compared to ~6 hours using a traditional nonlinear FEA code.
- A portion of the deployment of the entire solar array assembly has been simulated successfully. Run times were ~20 minutes.
- Predicted deployment torque in the tube (by RecurDyn) matched test results well within 5%.