

# Enhancing the International X-Ray Observatory

Dean Dailey, Rolf Danner, Chuck Lillie

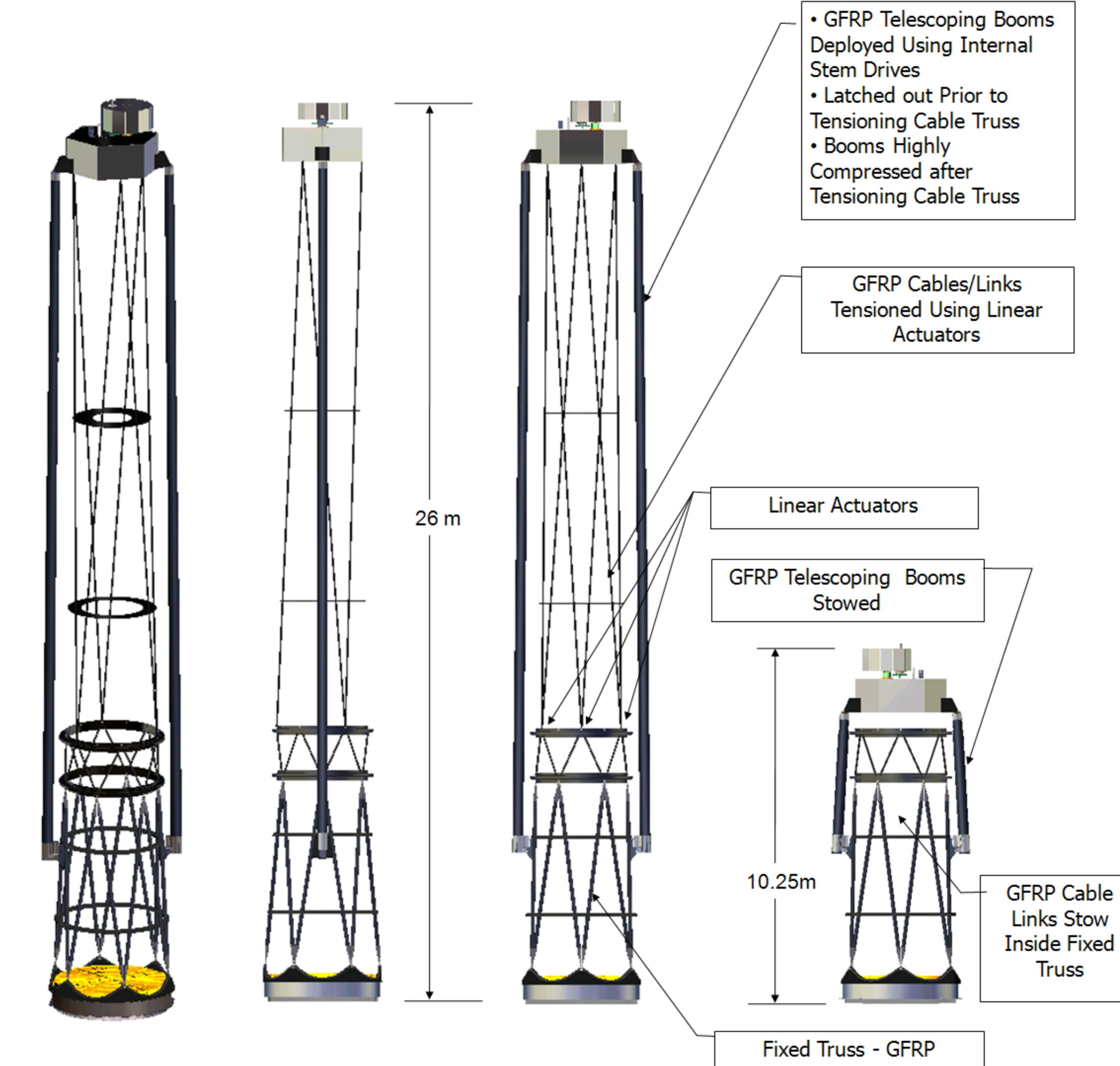
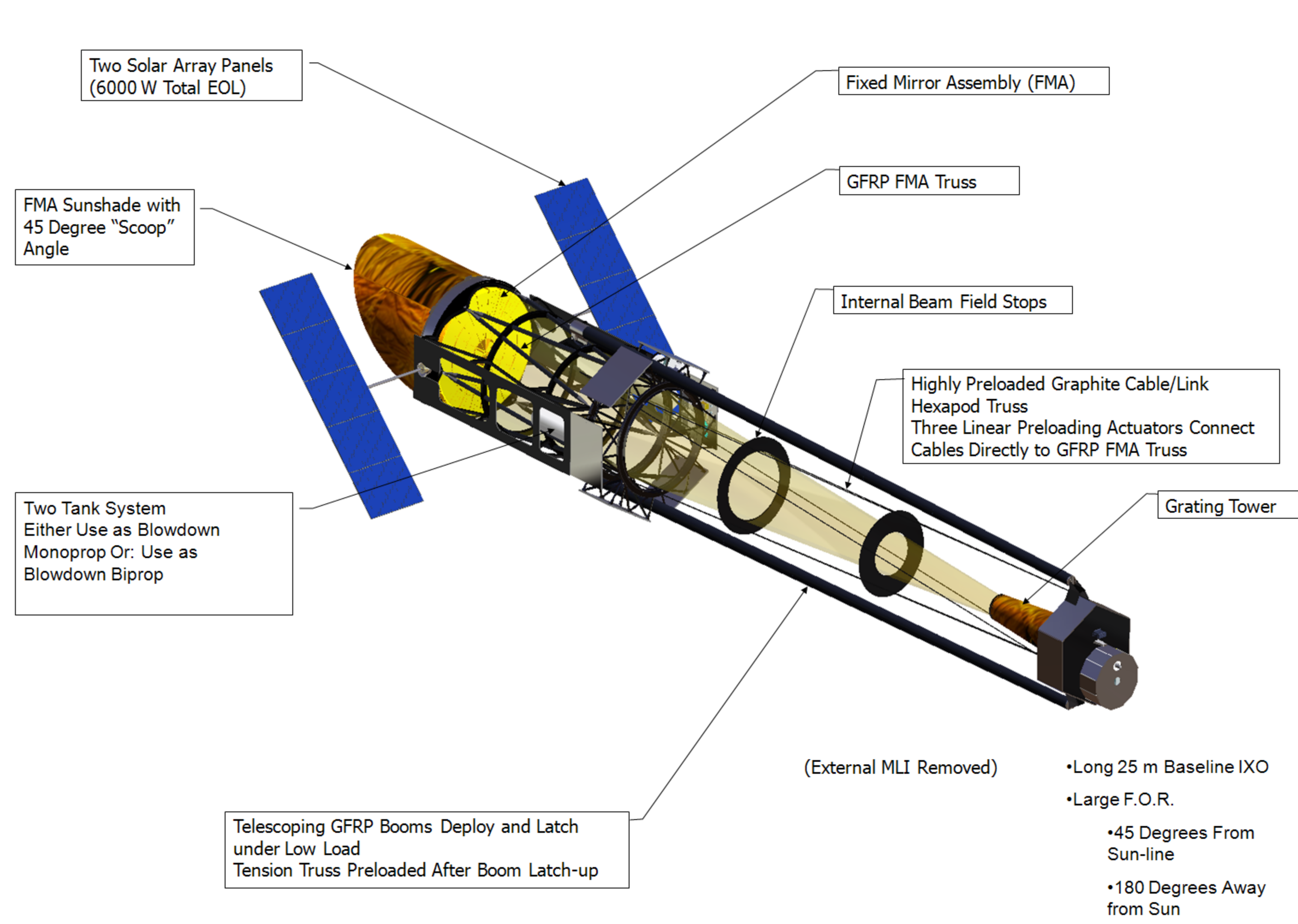
Northrop Grumman Aerospace Systems, One Space Park, Redondo Beach, CA 90278

## Abstract

We present preliminary results of systems studies expected to significantly enhance the science utility and reduce technical as well as cost risks for the International X-ray Observatory (IXO). Our Northrop Grumman team draws on the experience of building and operating Chandra and others of NASA's premier astrophysical observatories (Compton Gamma Ray Observatory, James Webb Space Telescope) as well as our experience as a leading developer of deployable space structures. For IXO, we have developed (a) an optical bench concept that increases the focal length from 20 to 25 m within the current mass and stability requirements; (b) an instrument and system layout that increases the accessible field of regard; and (c) a number of design choices based on flight proven concepts that reduce cost risk.

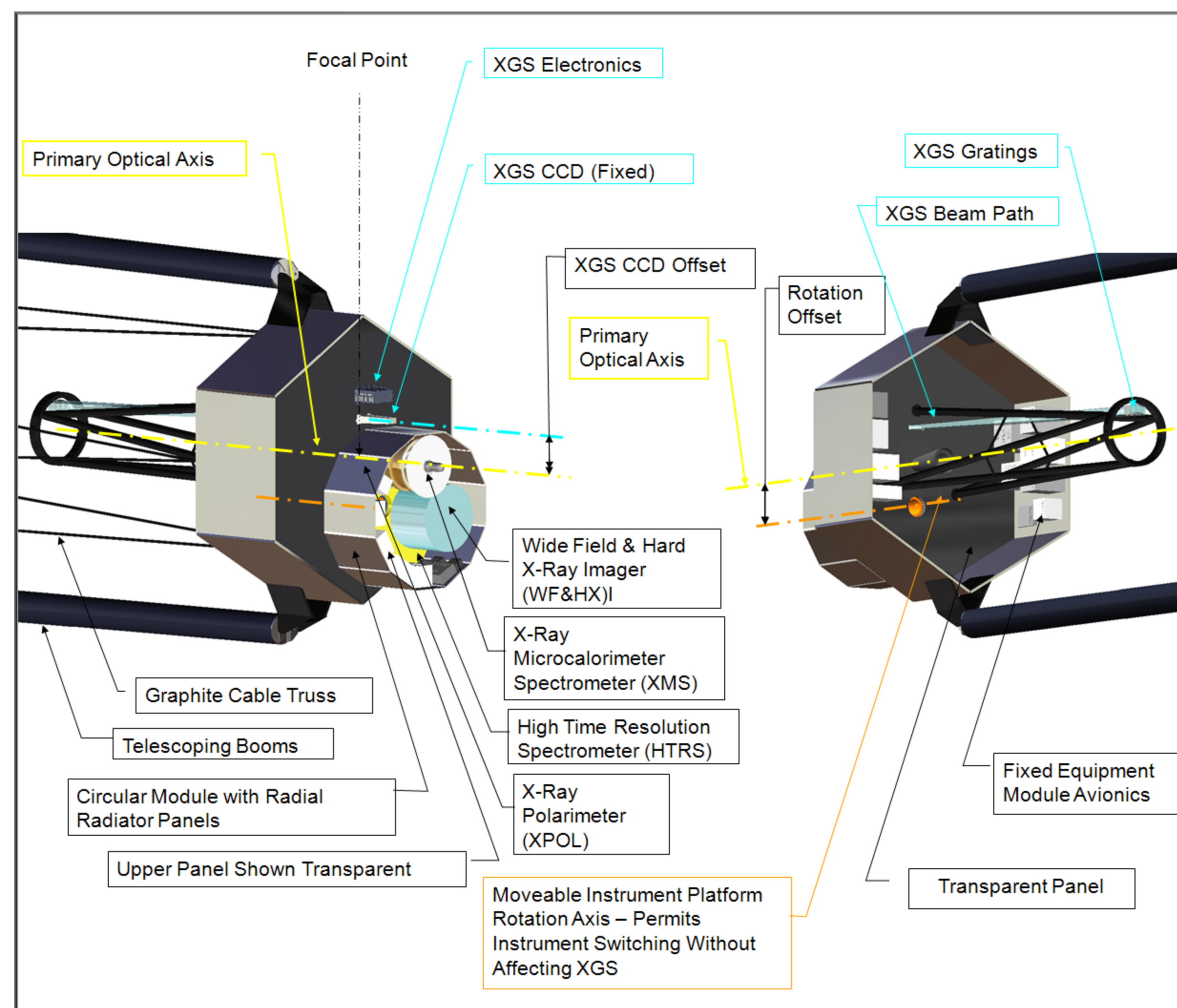
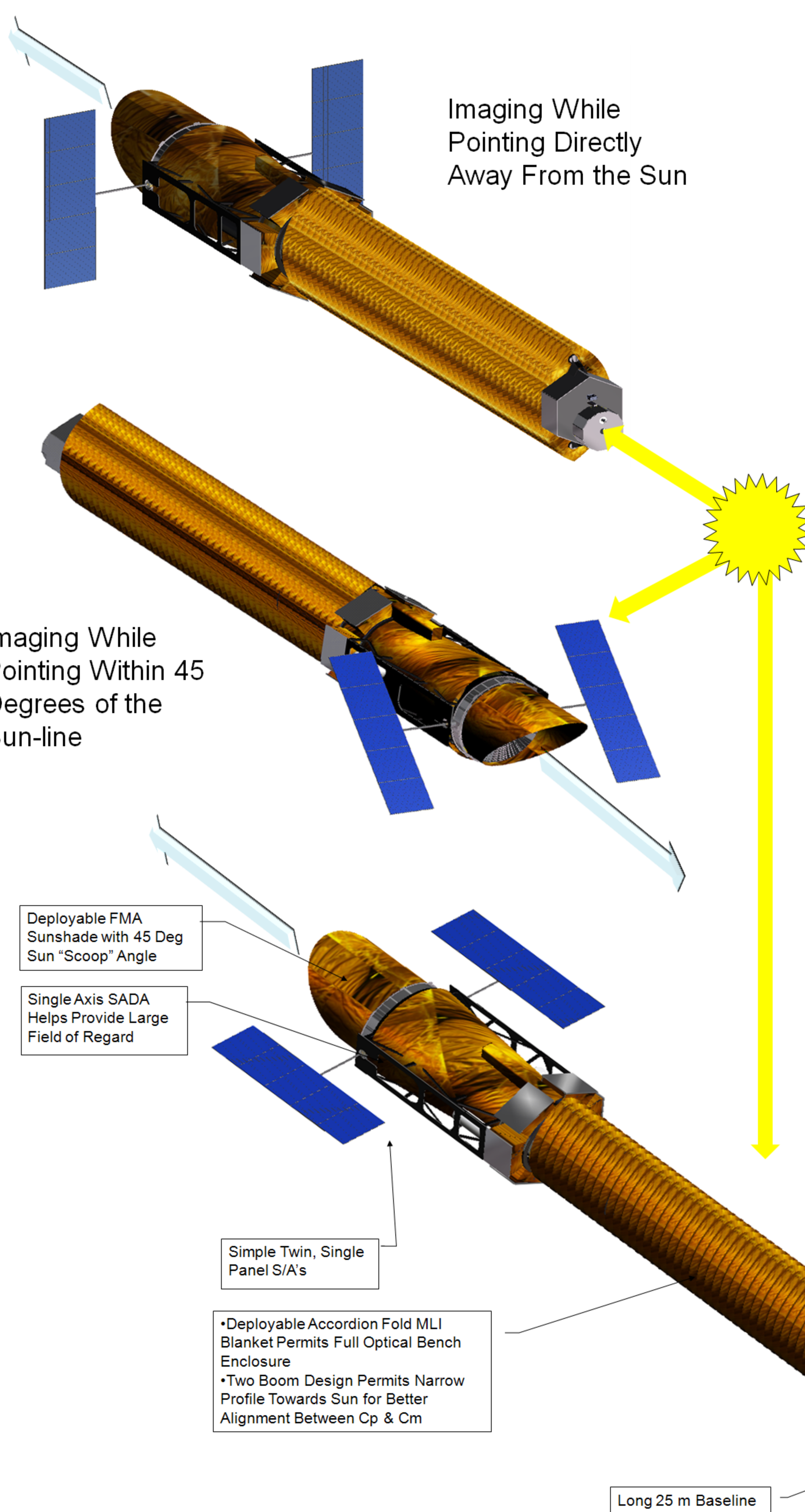
Our concept for the IXO deployable bench is a Tensegrity structure formed by two telescoping booms (compression) and a hexapod cable (tension) truss. This arrangement achieves the required stiffness for the optical bench at minimal mass while employing only high TRL components and flight proven elements. While the overall concept is innovative and will require further evaluation, it is based on existing elements, can be fully tested on the ground and does not require any new technology.

We have also explored the options opened by using hinged, articulating solar panels, and found that when used along with a fully enclosed MLI tent surrounding the optical bench, and an instrument module utilizing radially facing radiator panels, the enhanced configuration will enable us to greatly increase IXO's field of regard without distorting the optical bench beyond acceptable tolerances, making more of the sky accessible for observation at any given time.



## Overall System Concept Enhances Science Utility

## Tensegrity Structure Increases Focal Length within Current Mass Allocation

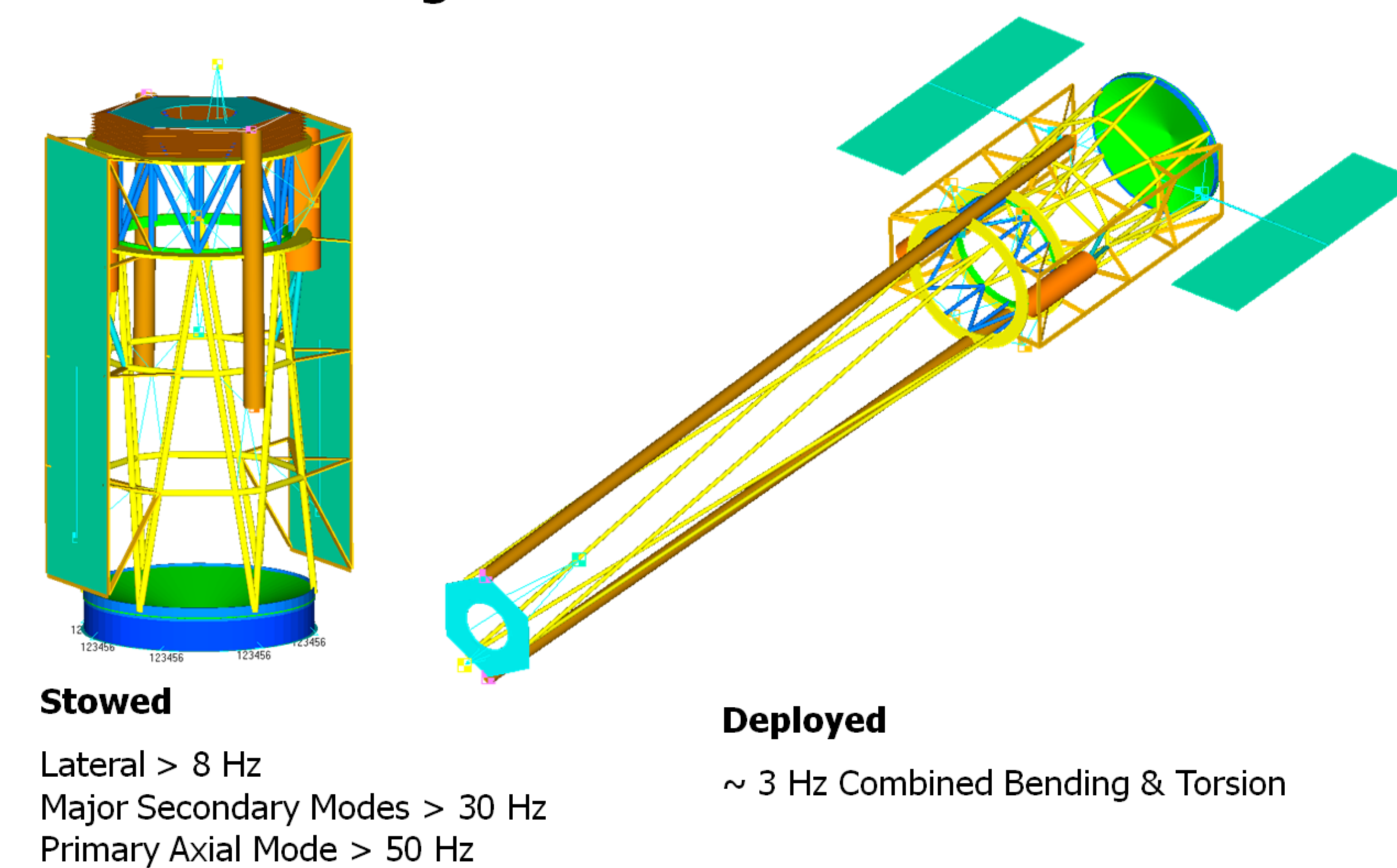


## Instrument Module

## Deployed Configuration With Enhanced Field of Regard



## Stowed Configuration



## Finite Element Model Modal Analysis