



# NFLW—Notching and Force Limiting Workshop

**Course Overview:** NFLW is a one-day computer workshop that is available only as an optional follow-on to Instar’s STDI (Structural Test Design and Interpretation) or VTSS (Vibration Testing of Small Satellites) course. We provide in advance several MicroSoft Excel spreadsheets to be used in class. The instructor guides the class to complete the first spreadsheet by filling in the applicable equations, as covered in STDI and VTSS. The class then uses that spreadsheet to work an example problem three ways, designing force limits, manual notches, and response limits. The class then similarly works two other examples.

The objectives of this workshop are for you to “learn by doing”. The goal is for you to be able to design technically justifiable force limits, manual notches, and response limits for future tests.

**Prerequisites:** Completion of either STDI or VTSS within 12 months of NFLW (preferably immediately before NFLW) or the teacher’s permission in advance. Each participant must have use of a computer with Microsoft Excel during class.

**Course Length:** One day, probably about six hours, including breaks and lunch

## Course Developer and Teacher:

**Tom Sarafin** is President and Chief Engineer of Instar Engineering and Consulting, Inc. He has worked full time in the space industry since 1979 as a structural engineer, a mechanical systems engineer, a project manager, and a consultant. Since founding Instar in 1993, he’s consulted for NASA, DARPA, the DOD Space Test Program, Lockheed Martin, DigitalGlobe (Maxar), U.S. Air Force Academy, Sierra Nevada Corp (Sierra Space), Planetary Systems Corp (Rocket Lab USA), and many other organizations. He was a key member of the team that developed NASA-STD-5020, “Requirements for Threaded Fastening Systems in Spaceflight Hardware” (March 2012). He is the editor and principal author of *Spacecraft Structures and Mechanisms: From Concept to Launch* and is a contributing author to *Space Mission Analysis and Design*. He’s also the principal author of a series of papers titled “Vibration Testing of Small Satellites.” Since 1995, he has taught over 300 courses to more than 6000 engineers and managers in the aerospace industry.



## Testimonials:

“This is a great addition to the VTSS course.”

“This workshop made yesterday’s (VTSS) class make so much more sense. Everything finally clicked.”

“As a stress analyst, this course bridged the gap of the FEA results to the test procedure.”

“Building out the formulas (from the STDI course) into the spreadsheets really helped reinforce the principles.”

“In my career at NASA, I have taken many courses, but none of them have been as beneficial as the three I have taken from you.”

Instar also offers the following courses: Space Mission Structures, from Concept to Launch (SMS), Structural Design and Analysis for Aerospace Engineers (SDA), Design and Analysis of Bolted Joints (DABJ), Structural Test Design and Interpretation (STDI), Vibration Testing of Small Satellites (VTSS), and Ten Principles for Successful Space Programs (TenP). Go to [instarengineering.com/available\\_courses.html](http://instarengineering.com/available_courses.html) for details.