STEVEN KIEFER

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Summary

I am a structural analyst with over 20 years experience working in the space industry, with significant experience with deployable structures, composite materials design & optimization, non-linear dynamics, geometric non-linear behavior, as well as traditional loads and dynamics & structural integrity assessments. I have consistently demonstrated innovation in simulation and mechanical test planning, execution, and data processing. In particular, weaving test and simulation to predict and/or verify product performance particularly when 'test as you fly' is not practical or possible. I have a passion for automation in simulation & test data processing, as well as building analytical tools to put specialized abilities into the hands of more engineers, technicians, and business development team members. I have excellent presentation & documentation skills and have demonstrated the ability to concisely distill and present complex topics in a digestible manner.

Technical Skills

- **Finite Element Analysis**: Ansys, Nastran, Abaqus
- **Numerical Analysis, Data Processing, & Automation**: Python, Pandas, SciPy, Numpy, OpenCV, Plotly, Streamlit, Dash

Recent Professional Experience

Redwire (Deployable Space Systems) | Goleta, CA - February 2014 - present (Independent Contractor)
Projects / Products: PPE[1] SAW, iROSA[1, 2, 3], IXPE [1] SAW, ROSA GEO Qual, ROSA Flight Experiment [1, 2, 3]
Lead structural & dynamic analyst for all phases (launch, deployment, deployed) of various solar array wing (SAW) products. Developed unique simulation methods for new technologies[1]. Worked with internal and external stakeholders to plan verification methods, identify risks, design structural & dynamic tests, simulate test & flight environments, & negotiate requirements as needed. Designed and analyzed rigid and flexible composite structures. Lead structural integrity efforts including fracture control, fatigue assessments, bolted joint analysis, composite failure, and bonded joint strength. Performed science-related structural analyses & data reduction including model correlation to vacuum dynamics testing. Developed python-based flight experiment data reduction tools including a real-time, time-varying filter of streamed data (from ISS) for real-time assessment of on-orbit swept sine dynamics testing (ROSA Flight Experiment).

ATK Space (Able Engineering) | Goleta, CA - July 2004 - January 2014
Projects / Products: Orion CEV Solar Array Wing, X-32
Composite structures lead engineer and structural analyst. Responsibilities included managing design, analysis, test, and fabrication tasks for the primary composite structural elements, developing specifications for composite structures to ensure that traceability and performance requirements are met, and managing sister-ATK site activities including material/parts procurement, composite part fabrication, design, analysis, and test.

Education

BS, Mechanical Engineering; University of California, Santa Barbara (2002)

Keywords

spacecraft, structural analysis, loads & dynamics, deployable structures, composite design and analysis, non-linear dynamics, non-linear simulation, automation, fracture control, design of experiment, structural verification, data analysis, analysis methods development, root cause corrective action lead

Additional Professional Experience

Keith Kedward & Associates | Santa Barbara, CA October 2005 - June 2013
Assisted in the development of a comprehensive safety awareness course for FAA engineers. Authored subsections of the composite structures volume, created presentation material covering many topics related to composite aircraft structures, and assisted in review and presentation of structures-related sections. Performed structural analysis of hydraulic and fuel isolators. Authored stress reports for customer review, presented results to Adel Wiggins (and their customers). Assisted in training the Adel Wiggins analysis group in ABAQUS for structural analysis of their fiber-wound composite aircraft products.
Performed a detailed review of the Goodrich proprietary composite laminate code. Assisted in the development and presentation of a two-day (2006) and seven-day (2008) composite structures design course.

Vision Composites Inc. | Signal Hill, CA - January 2003 - October 2003
Developed test methods/procedures for composite laminate allowables and sub-assembly structural elements including tubular composite struts. Performed proof load testing on sub-assemblies incorporating multiple strain gauge bridge configurations. Reduced data and authored full test reports for flight structural sub-assemblies.

Alphastar | Long Beach, CA - August 2002 - October 2003
Performed analyses using the composite progressive damage analysis software package GENOA. Supported SBIR programs focused on developing analysis methodologies for composite naval ship structures. Compared traditional FE analysis initial and final failure predictions to the progressive damage predictions produced by GENOA for typical naval ship structural joints. Analyzed composite ceramic components exposed to extreme environments. Assisted in presenting analysis results to SBIR-related industry members for the development of new CFCC materials

Medium Blog Articles

- ANSYS in a Python Web App, Part 2: Pre Processing & Solving with PyMAPDL
- ANSYS in a Python Web App, Part 1: Post Processing with PyDPF
- 3D mesh models in the browser using python & dash_vtk
- Make Your Own Video Editor App with Python, Dash, & Moviepy!
- Embed Multiple Dash Apps in Flask with Microsoft Authentication
- Energize Your Ansys Dynamic & Mechanical Analyses
- Ansys Mechanical: All About Joints
- Computing Mass Properties of Ansys Dynamic Models

Journal & Conference Publications

- ***Structural Analysis Methods for the Roll-Out Solar Array***
  6th AIAA Spacecraft Structures Conference, AIAA SciTech Forum · Jan 11, 2019
- ***Photogrammetry-Based Analysis of the On-orbit Structural Dynamics of the Roll-Out Solar Array***
  6th AIAA Spacecraft Structures Conference, AIAA SciTech Forum · Jan 11, 2019
- ***On-orbit Structural Dynamics Performance of the Roll-Out Solar Array***
  5th AIAA Spacecraft Structures Conference, AIAA SciTech Forum · Jan 12, 2018
- ***Commercialization of Deployable Space Systems' roll-out solar array (ROSA) technology for Space Systems Loral (SSL) solar arrays***
  IEEE · Mar 5, 2016
- ***Adhesively Bonded CFRP Tubular Joint Strength***
  SAMPE · Apr 30, 2006