Nano-Satellite Launch Adapter System (NLAS) – Overview
NLAS Objectives, Relevance & Schedule

Nano-Satellite Launch Adapter System (NLAS)

Objectives:
• Increase the access to space by having the capability to deploy 8x 3U, 4x 6U or a combination of nano-satellites (1U, 1.5U, 2U, 3U, 6U)
• Provides a modular platform with a configurable sequence and schedule for deploying multiple secondary nano-satellite payloads from launch vehicles

Relevance/Impact:
• NLAS provides the manifest and access to space capabilities for a variety of secondary nano-satellites that are able to perform space science, including Astrophysics, Exobiology, Heliophysics, Earth Science and possibly even Planetary Science.
• NLAS also enables the flight demonstration of new technologies in the space environment by providing a greater number of opportunities for access to space and hosting of these technologies on nano-satellite platforms.

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NLAS System Overview

Nano-Satellite Launch Adapter System includes:
- 1x NLAS Sequencer
- 1x NLAS Sequencer Test Box (GSE)
- 4x NLAS Dispensers
- 1x NLAS Adapter
- Miscellaneous cables

Adapter: ~40 inches in Diameter
System mass: ~ 95kg (excluding payloads)
Payload capacity: 24U
NLAS Elements During I&T

- NLAS Adapter
- NLAS Sequencer
- NLAS Dispenser
Example of 2x NLAS In A Launch Vehicle Stack

Primary Spacecraft

NLAS Adapter

NLAS Dispenser

NLAS Sequencer

LV Adapter

NLAS

NLAS w/ PPODs

PPOD
NLAS During I&T (Programming Sequencer)
NLAS Sequencer

- Size: ~10 x 8 x 3.7 inches
- Mass: ~1.9kg
- Fully programmable time sequence for all outputs from 1 second to 6 hours
- Single input signal from launch vehicle
- 8x Output signals for PPOD or NLAS Dispensers actuators
- 1x Auxiliary output for additional device or “Daisy Chaining” of Sequencers
- Internally powered (~2 month standby power, 6+ hour operational power)
- LED status indicators
- Redundant controller boards
- Redundant output pulses
- Hardware and software noise rejection for LV input signal
- Remove & connect before flight inhibits
- Patent pending, licensing available

Successfully flown on 19 November 2013
NLAS Dispenser

Successfully flown on 19 November 2013

- Size: ~10.5 x 18.3 x 5.6 inches
- Mass: ~6.3kg 3U / 5.4kg 6U
- Spring energized deployer
- Reconfigurable design supports either two 3U bays or a single 6U bay
- Payload mass: 2x 6kg (3U) / 14.0 kg (6U)
- Ejection velocity: ~1.5m/s for 6.0kg 3U payload
- Resettable TiNi actuators with redundant triggers
- Multiple mounting orientations
- Tested operations at -18°C to +50 °C (0°F to +122°F)
- Shocked and Random Vib’d to GEVS
- Design release package available
NLAS Adapter

- Size: ~40 inches diameter x 10 inches
- Mass: ~63.3kg
- Interfaces to LV uppers stage and primary spacecraft
- Standard LV mating interfaces:
  - 38.81 inch diameter bolt circle
  - 15 inch diameter bolt circle
- Accommodates up to 24U of deployers:
  - 4x NLAS Dispensers,
  - 8x CalPoly PPODs,
  - Or a combination
- Mounting locations for NLAS Sequencers and miscellaneous cables
- Auxiliary mounting locations on Isogrid
- Stackable for multiple systems in a single launch

Manifested for launch in CY2014
NLAS Status & Inventory

• **Successfully delivered April 2013:**
  - 1 NLAS Adapter
  - 3 NLAS Sequencers
  - 8 NLAS Dispensers
  - 1 NLAS Dispenser Test Article

• **Successfully flown 19th November 2013:**
  - 2 NLAS Sequencers
  - 4 NLAS Dispensers

• **Manifested for 2014**
  - 1 NLAS Adapter
  - 1 NLAS Sequencers
  - 3 NLAS Dispensers

• **Future flights**
  - 1x 6U NLAS Dispenser for EcAMSat
  - 1x 3U NLAS Dispenser (flight spare)

• **Support for future missions**
  - 1x NLAS EDU Sequencer
  - 1x NLAS EDU Dispenser

• **NLAS Sequencer Patent Pending**
• **NLAS Dispenser Release Package Available**

NLAS Elements Successfully flown on 19 November 2013. Sequencers commanded the deployment of 28 CubeSats.