Masten Space Systems

David Masten, CEO
dmasten@masten-space.com

Michael Mealling, VP Business Development
mmealling@masten-space.com

P.O. Box N
Mojave, CA 93502
(678) 581-9656

Masten
SPACE SYSTEMS

Reusable, Operable, Affordable, Maintainable

- Changing how launch vehicles are done
- Multiple flight missions per day
- Lead times of days or weeks not years
- Small ground and flight crews
- Affordable, orders of magnitude less than traditional vehicles
- Build a little, test a lot

Safe.

Masten
SPACE SYSTEMS

Vehicle Capability Road Map

- Low speed, low altitude; focus on operations and maintenance.
- Increase delta-V, aerodynamics, space rating systems.
- Sub-orbital up and down.
- Nanosat/CubeSAT capable expendable upper stage
- Sub-orbital point to point.

Masten
SPACE SYSTEMS

Payloads

- Micro-gravity, upper atmosphere, Earth observation, astronomy...
- Education and outreach experiments
- Fly multiple times in a short period
- Unplanned re-flights on short notice
- You can afford to do “What if?” science
- Cross the TRL “valley of death” for a tenth of the cost
- *Cost effectively test your payload in space before its in orbit*

Masten
SPACE SYSTEMS

Payload Customers

- Military
- Aerospace Industry/R&D
  - Defects/risk go down when flight included in QA process prior to shipping product
  - Frequent flights built into R&D process
- University Research
- University Aerospace Education
- K-12 educators
  - 10% of US high school students could enter college having already built and flown a payload in space
- Amateurs/Prosumer
  - Participatory exploration where you are in the lead, not NASA.

Masten
SPACE SYSTEMS

Hardware Timeline

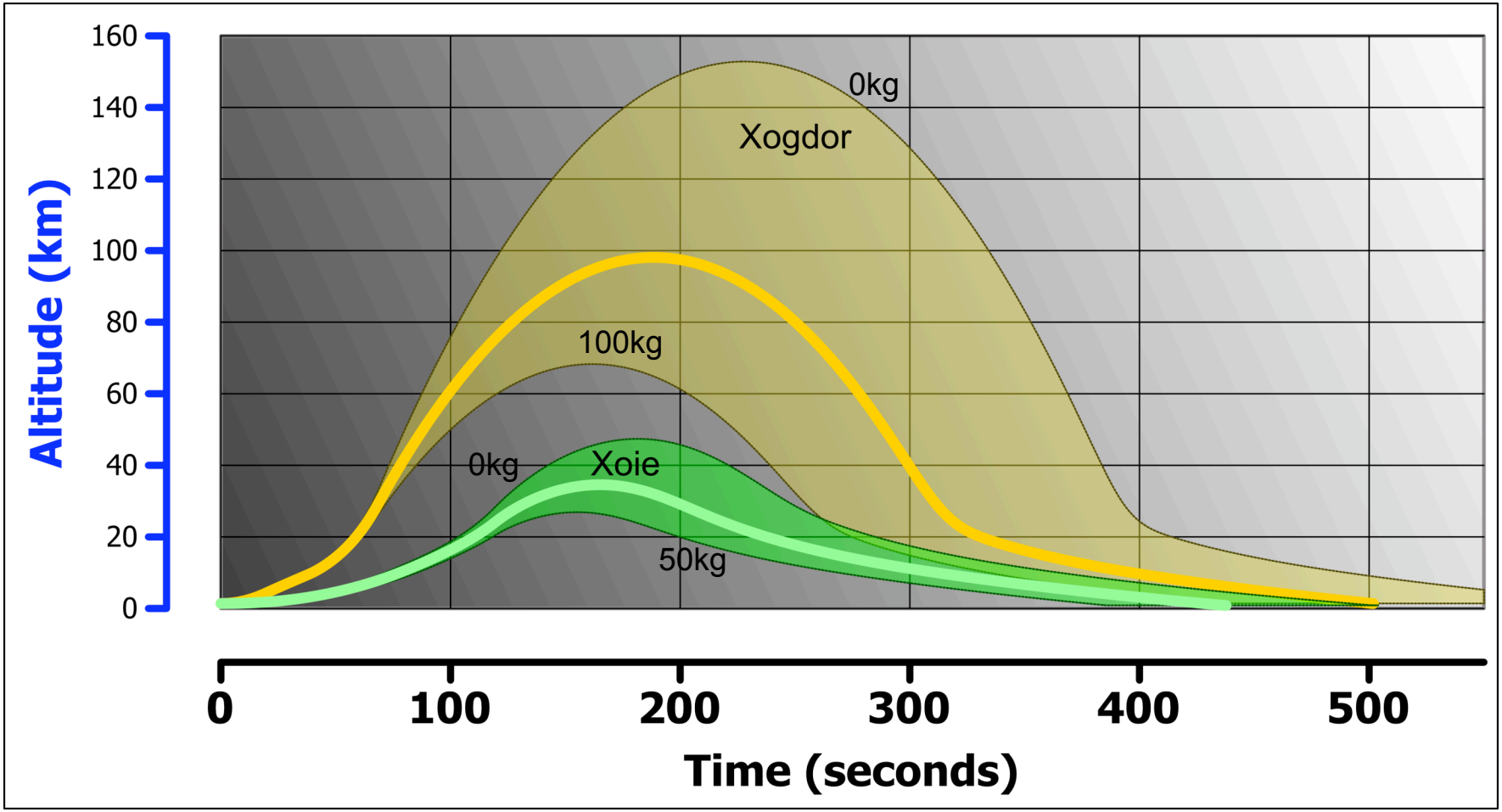
- 2009
  - “Xombie” - Basic VTVL demonstrator
  - “Xoie” - 200+ second flight-time
- 2010
  - “Xoie v2” - XA-0.1E with an aeroshell, supersonic testing, 36km altitude, engine relight
  - 3000lbf engine
  - “Xogdor” - Exploring the Ignorosphere” 36-100 km altitude.
- 2011+
  - XA-1.0 – up to 150km altitude, several minutes of high quality (10^{-6} g) micro-gravity, commercial suborbital flights
  - Orbital nanosatellites via expendable 2nd stage

Masten
SPACE SYSTEMS

XA-0.1B - “Xombie”

- Re-usable sub-scale prototype.
- Test controls and integration.
- LOX and isopropanol
- Pressure fed engine
- ~1000 m/s delta-V with 25kg payload
- Won NG-LLC Level 1 2nd place
- 30 minute turn time between flights
- <20cm (8in) landing accuracy

Masten
SPACE SYSTEMS



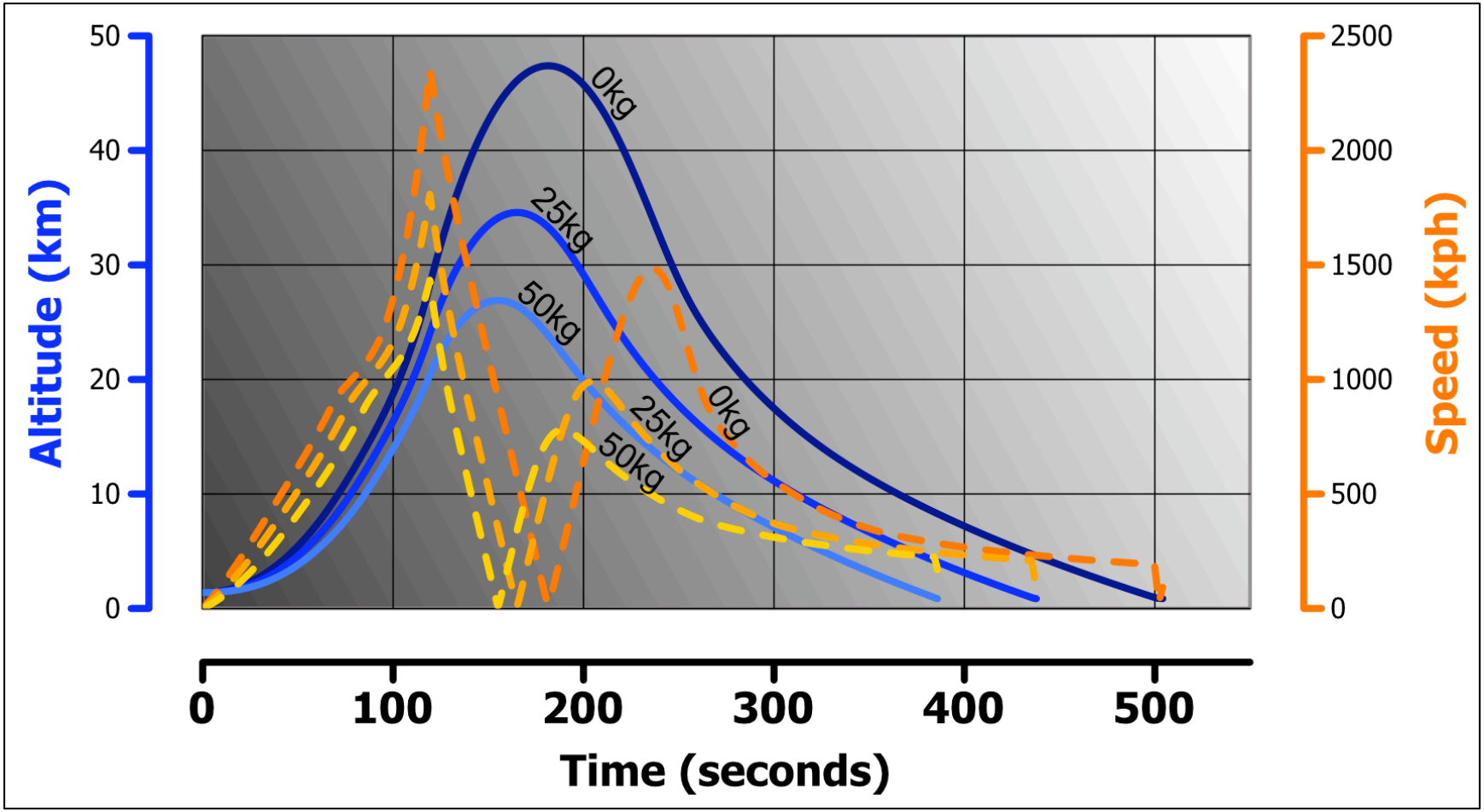
Masten
SPACE SYSTEMS

Xoie and Xogdor Altitude Profile

XA-0.1E - “Xoie”

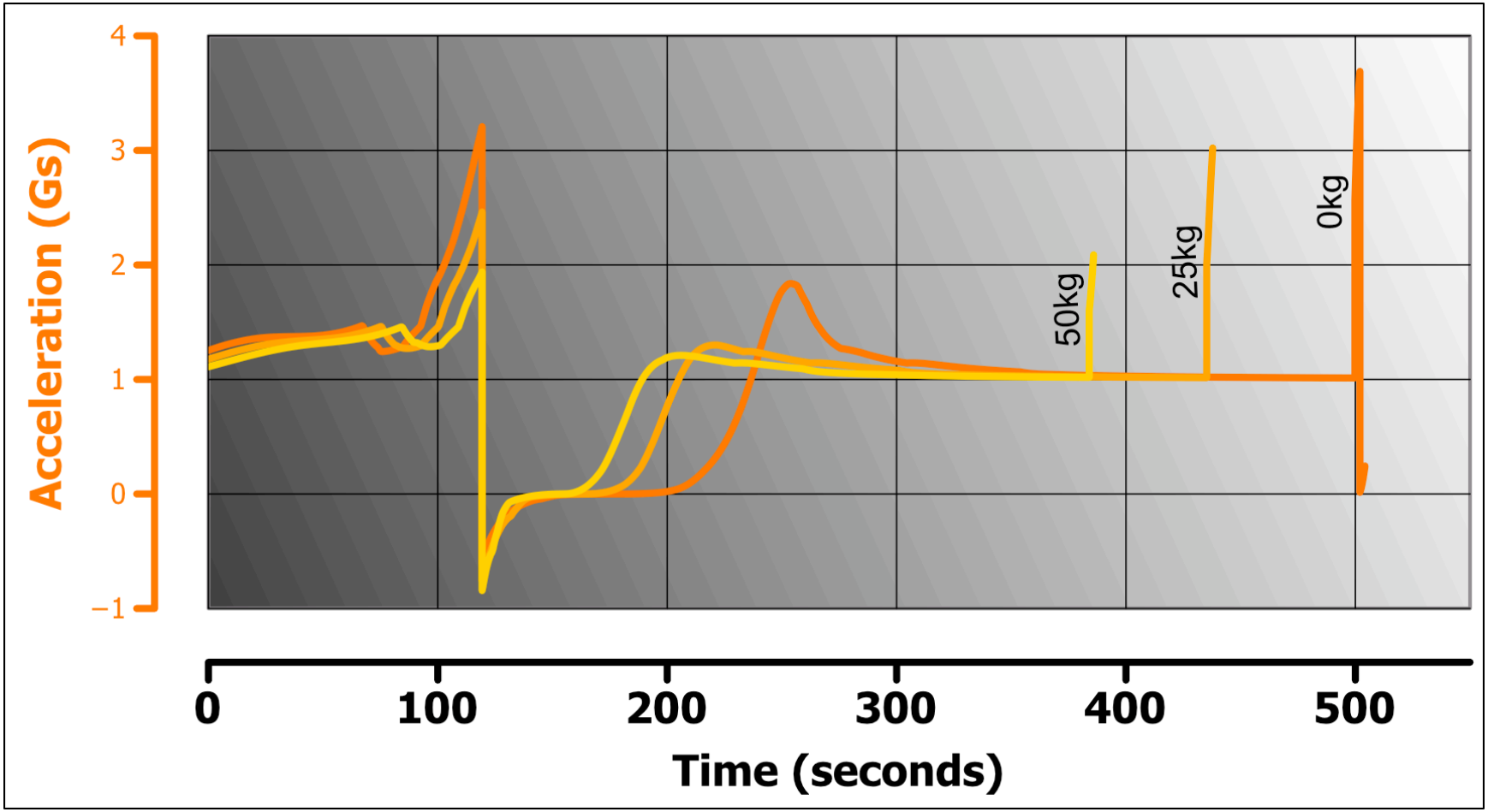
- Second reusable prototype
- Improved mass ratio
- ~2500 m/s delta-V with 25kg payload
- Carbon composite fuel and pressure tanks
- Won NG-LLC Level 2
- High accuracy landing
- 40 minute turn time between flights

Masten
SPACE SYSTEMS



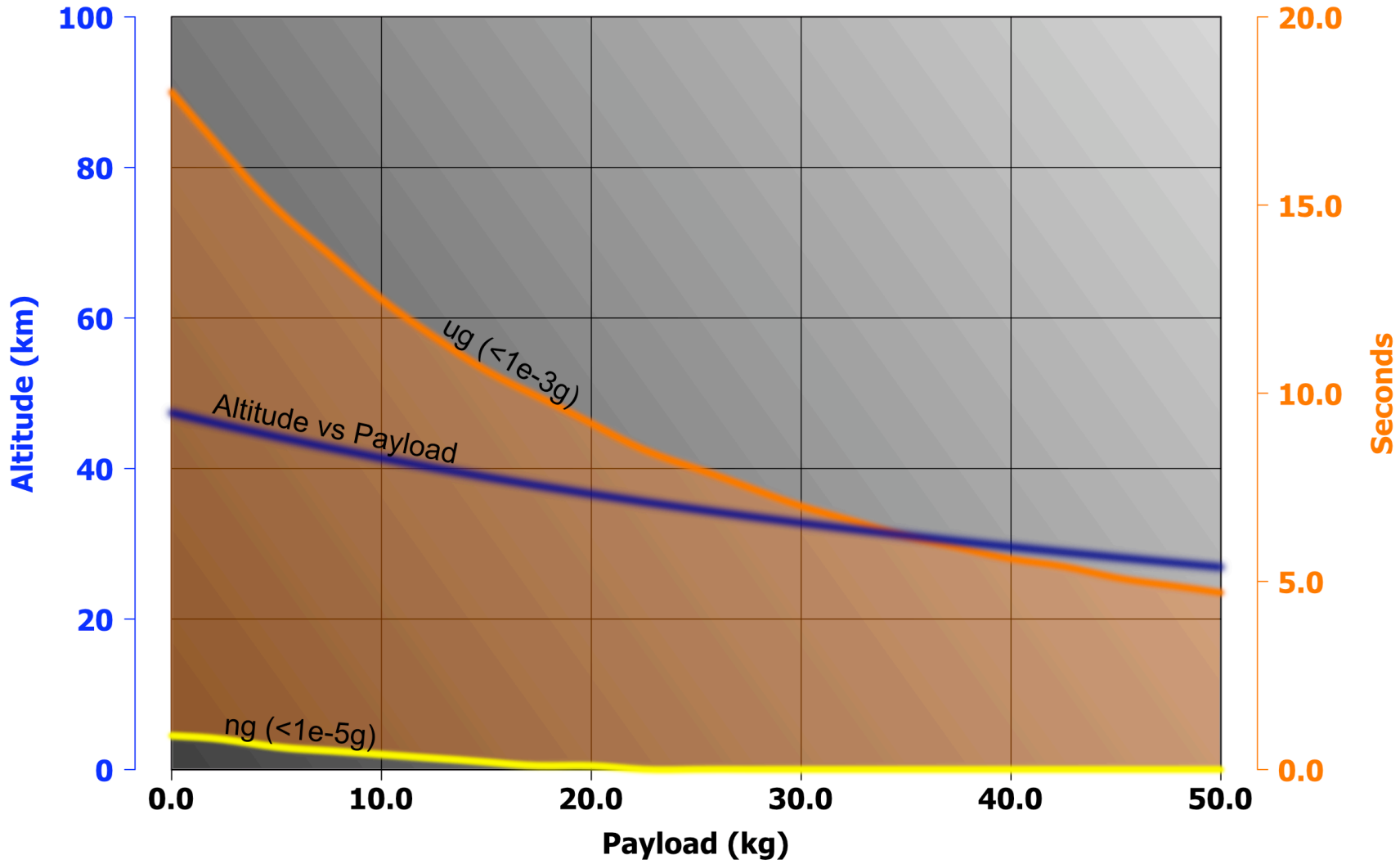
Masten
SPACE SYSTEMS

Xoie Altitude & Velocity vs Time



Masten
SPACE SYSTEMS

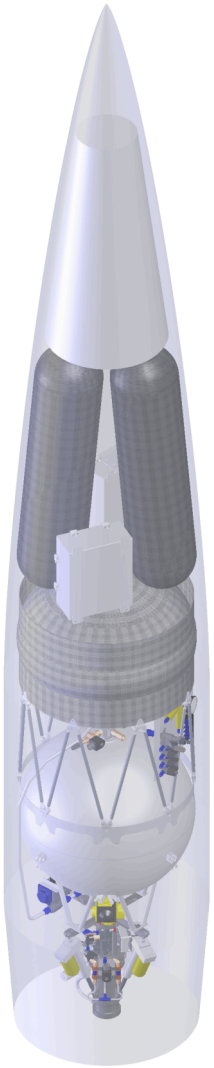
Xoie Acceleration Loads



Micro/Nano gravity for Xoie

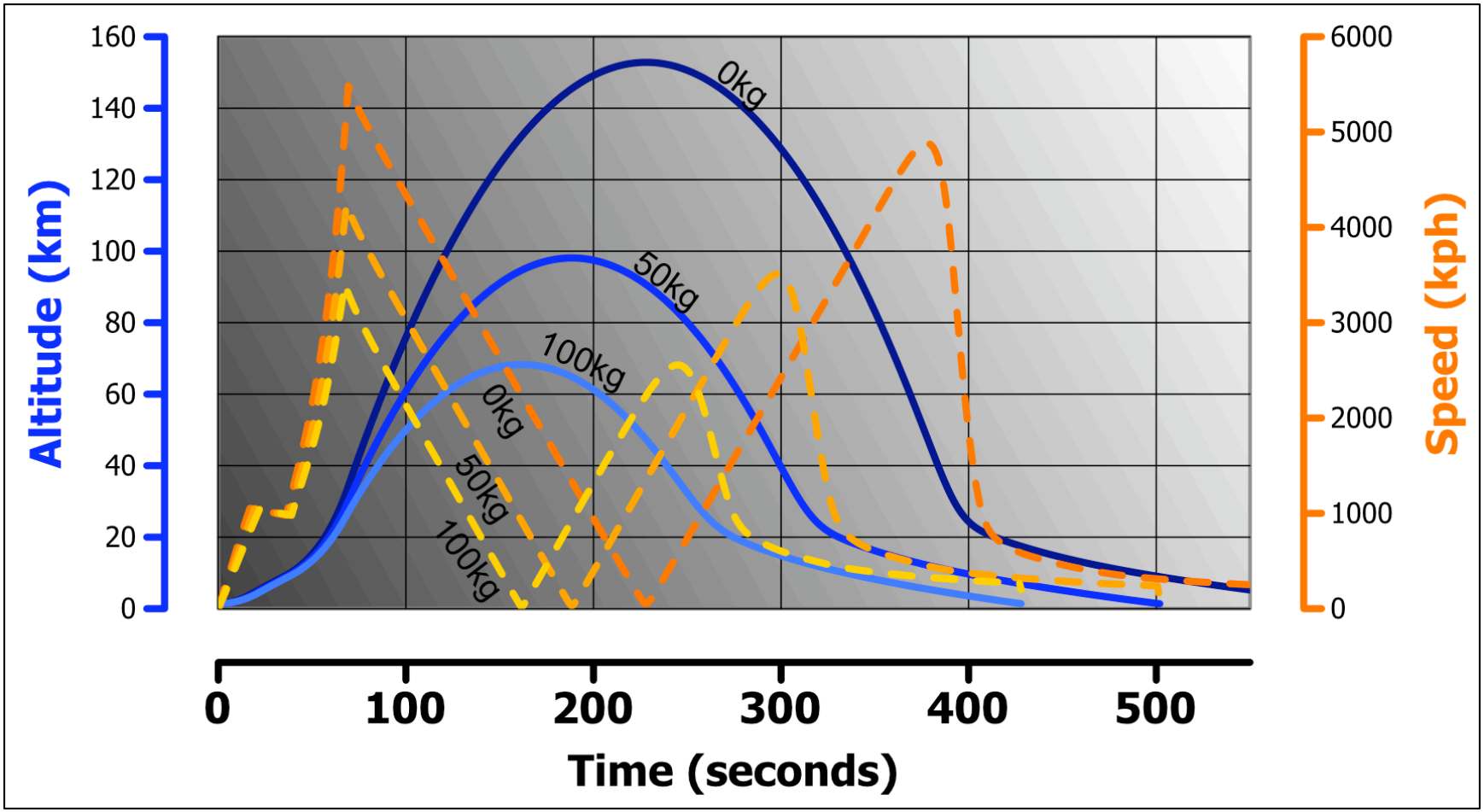
Masten
SPACE SYSTEMS

XA-0.1g - “Xogdor”



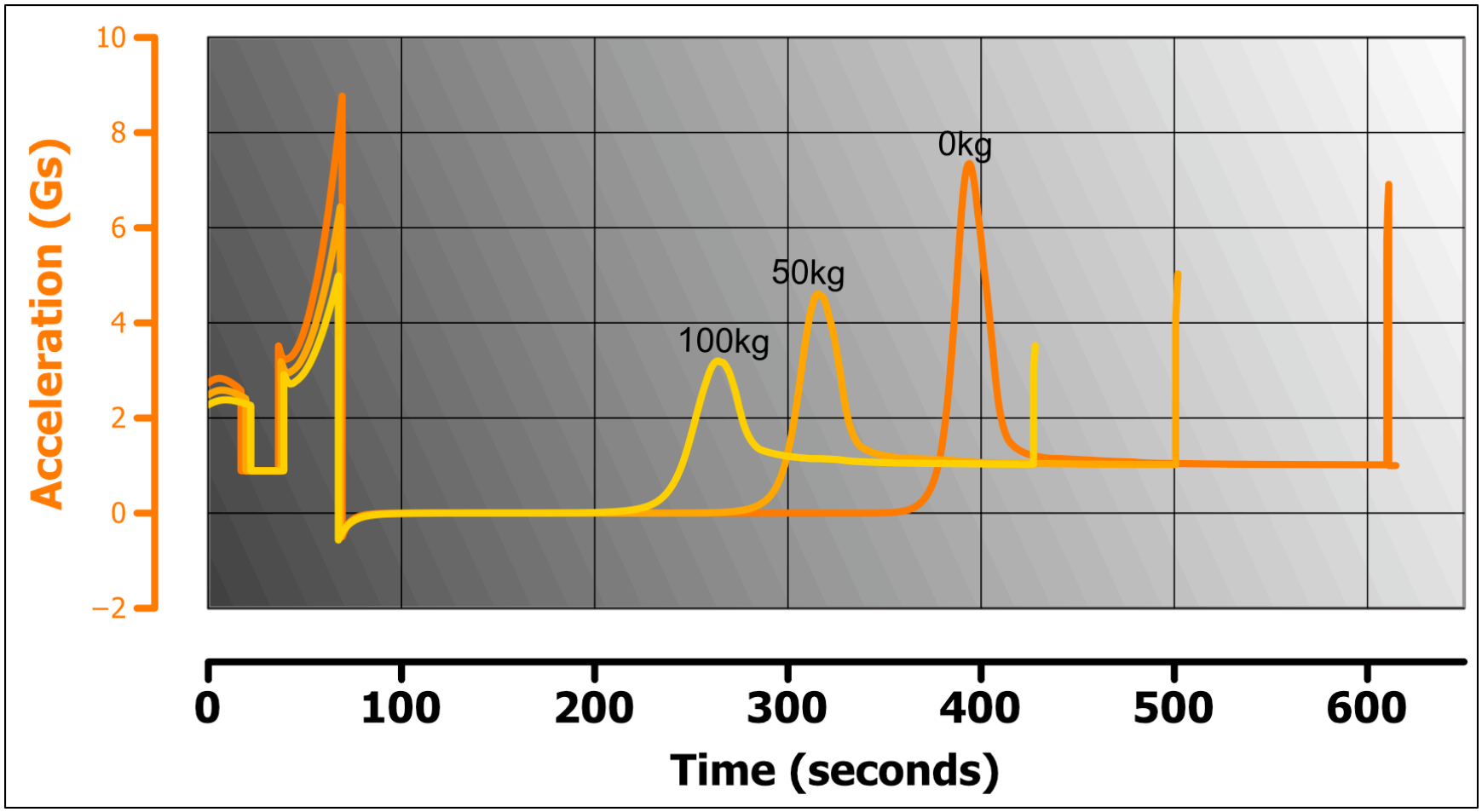
- Third reusable prototype
- Improved mass ratio
- Carbon composite fuel and pressure tanks
- Space capable
- Max altitude: 78km
- Payload Volume: 87,600cm

Masten
SPACE SYSTEMS



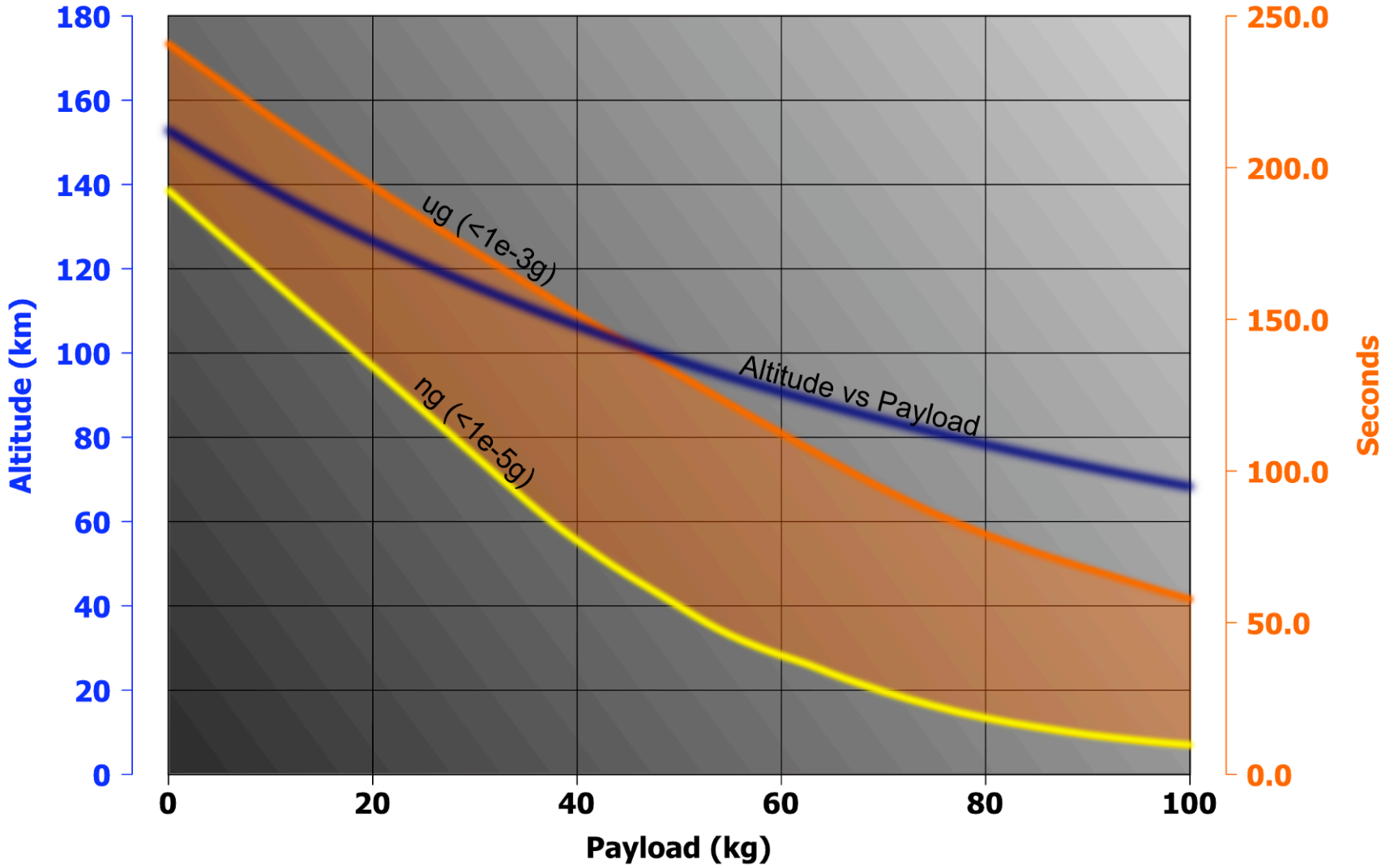
Masten
SPACE SYSTEMS

Xogdor Altitude & Velocity vs Time



Masten
SPACE SYSTEMS

Xogdor Acceleration Loads



Masten
SPACE SYSTEMS

Micro/Nano gravity for Xogdor

Atmospheric Scientists

- Regular flights above 30km (100k ft) toward the end of this year.
- Ideal for atmospheric scientists
- Time to talk to us about your requirements is now.

Masten
SPACE SYSTEMS

Questions?

We want to hear from you:

David Masten, CEO
dmasten@masten-space.com

Michael Mealling, VP Business Development
mmealling@masten-space.com

Masten
SPACE SYSTEMS