

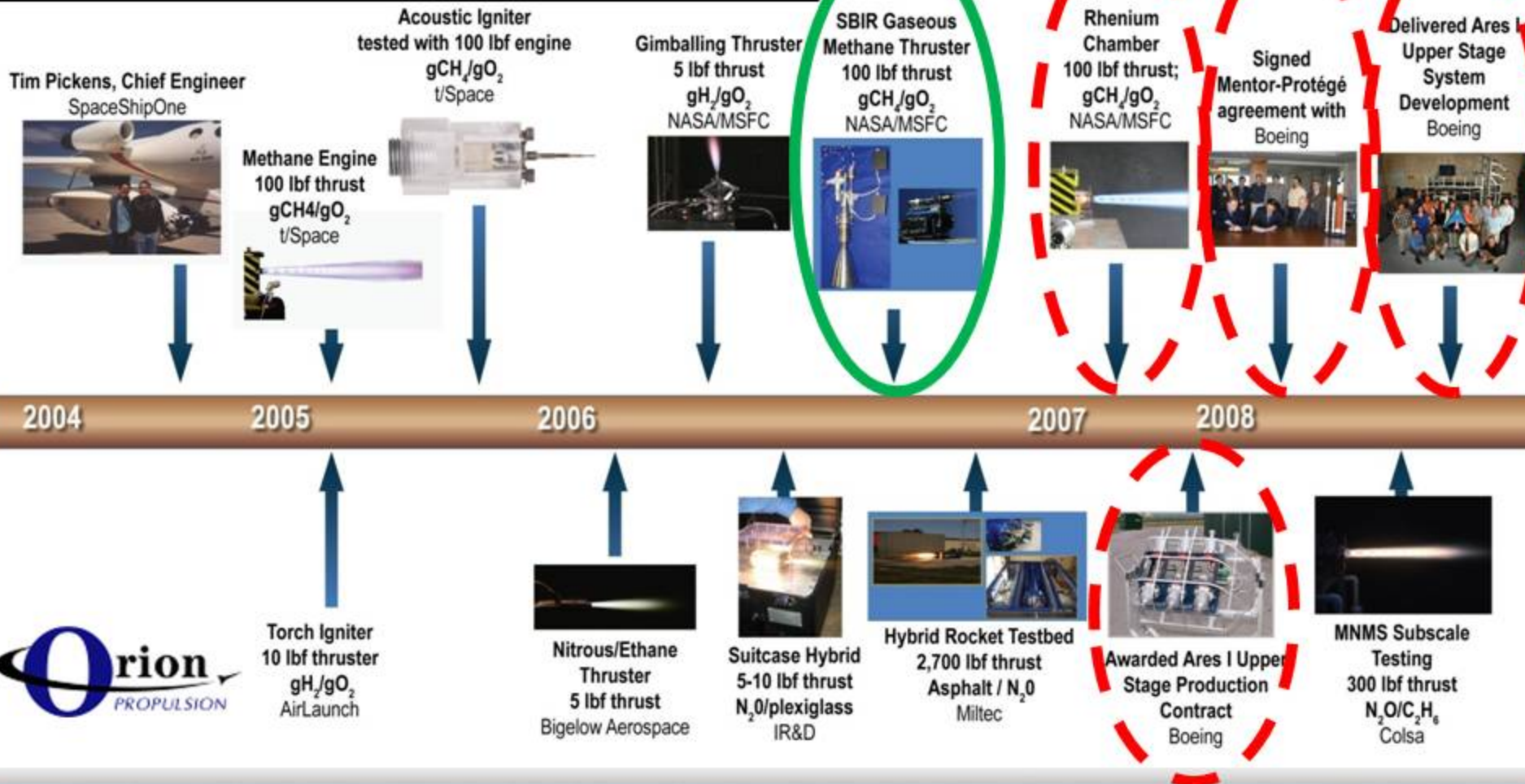
# Dynetics Space Propulsion and the Benefits of NASA Small Business Support



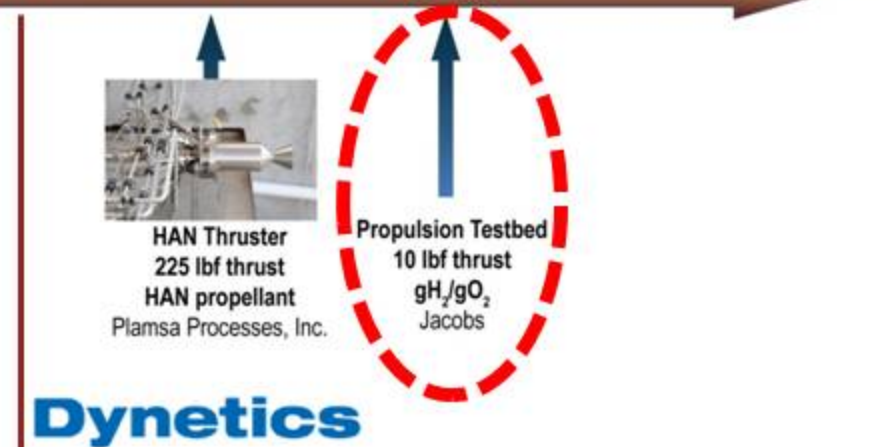
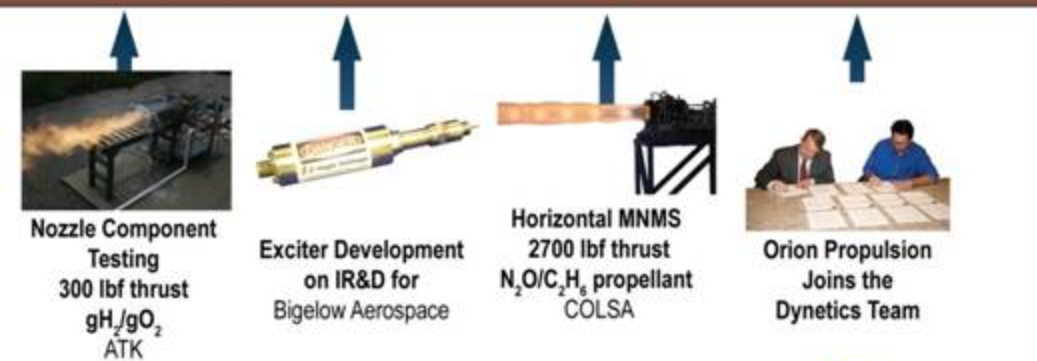
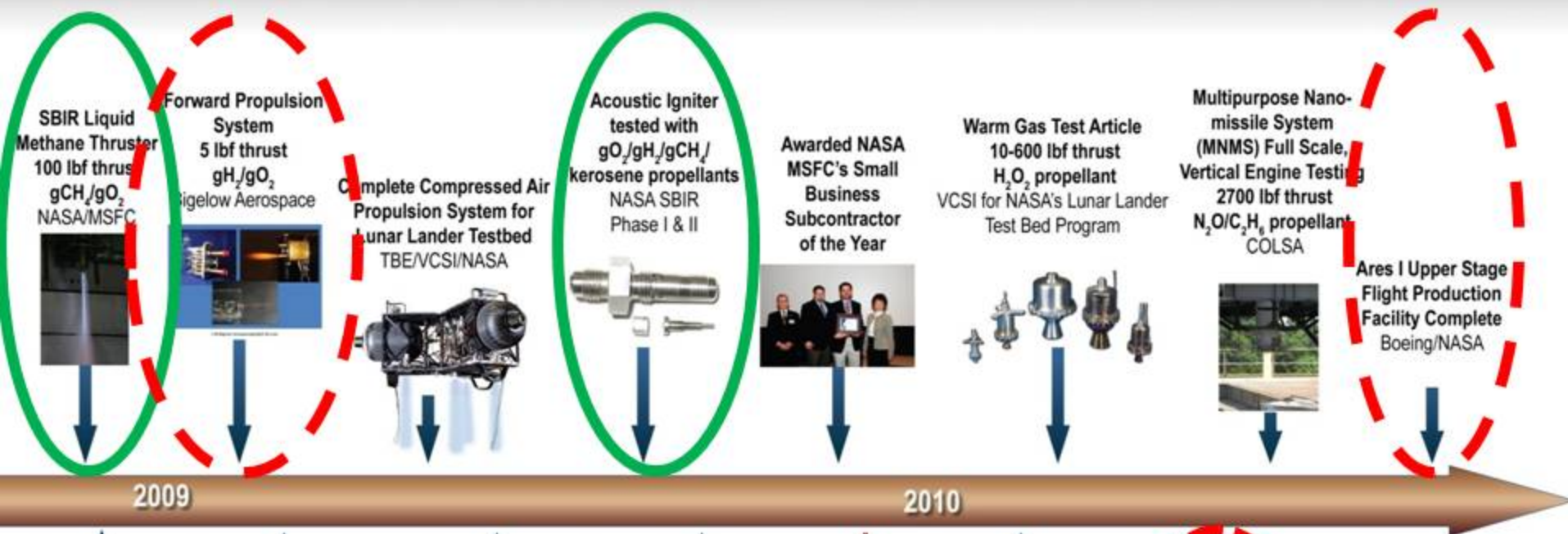
**Dynetics**

# Dynetics Space Propulsion History and the Benefits of NASA Support of Small Businesses

- **Directly funded by NASA (SBIRs, etc.)** —
- **Contracts / accomplishments indirectly as a result of NASA support** - -



# Dynetics Space Propulsion History and the Benefits of NASA Support of Small Businesses (cont'd)



# Direct and Indirect Benefits of NASA SBIR/STTR Funding

## Example: Oxygen/Methane Thruster to Bigelow FPS Modules

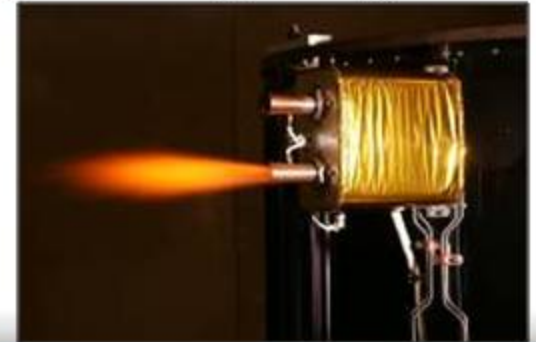
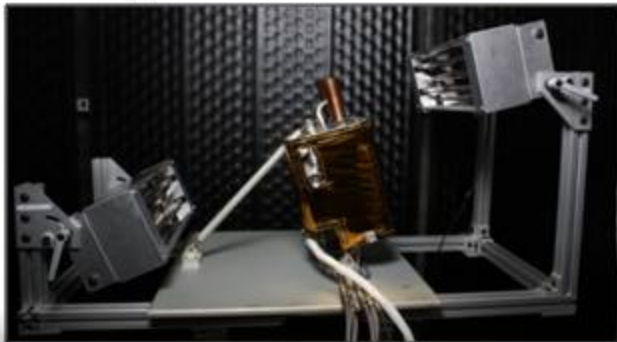
- **Direct Benefits:**

- **Completed SBIR Phases I and II for NASA MSFC, ended Dec 2008**
- **Developed an Oxygen/Methane thruster to advance the technology of alternate fuels for spacecraft reaction control systems (RCS)**



- **Indirect Benefits:**

- **Oxygen/Methane thruster SBIR applied to design, development, and test of a vacuum-qualified Oxygen/Hydrogen propulsion module for Bigelow Aerospace**
- **Design, qualified, and delivered Forward Propulsion System (FPS) for Bigelow's Sundancer—commercial space habitat capable of supporting crew**



# SBIR/STTR Benefits for Large Businesses

- **Dynetics (and other large businesses) work with small businesses to leverage SBIR/STTRs beyond technology development funding for the SB:**
  - **Demonstrates LB support (and future customer need) to the government**
  - **Serves as government-funded IRAD (through the SB) for the large business**
  - **Kick-starts LB/SB cooperation on areas of mutual interest**
  - **Enables LB/SB relationship-building opportunity**
- **Acknowledgements:**
  - **SBIR/STTR funding can be a slow process**
    - ◆ **Has to be part of a long-term plan**
    - ◆ **Probably can't be for near-term (6-12 month) technology need**
  - **Not a lot of funding to prove out technologies, especially for production**
  - **Must protect intellectual property (for both LBs and SBs)**
  - **Requires extra effort, which is hard to get from either LB or SB**

*©Dynetics / MetLife Insurance Policyholders' Association of the United States, 10 days and 10 nights of business*

# Another Opportunity for NASA Support: Mentor-Protégé Agreement

- **NASA and DoD sponsor Mentor-Protégé arrangements between LBs / SBs that represent unique learning and growth opportunities for the SBs**
- **In March 2008, Orion Propulsion, Inc. and Boeing entered a M-P agreement under NASA sponsorship based on mutual interests and common goals**
  - **Ares I Upper Stage Production**
  - **Small Business targets**
  - **Growth of OPI capabilities**
- **What OPI/Boeing agreement was about:**
  - **Technical training (such as AS9100B cert.)**
  - **Business development / operations training**
  - **Technical Readiness Level advancement**
- **Unwritten benefits of the M-P agreement:**
  - **Large company advocate**
  - **Exposure to other parts of the business**
  - **Exposure to the industry**
  - **Media coverage**



# Summary

- **NASA (and many government agencies) offer numerous direct and indirect opportunities for SB tech development, relationship-building, and growth**
  - **SBIRs/STTRs**
  - **Small businesses set-aside (or % allocations of full and open) contracts**
  - **Mentor-Protégé agreements**
  - **Off-ramps and/or growth from all of the above**
  - **Etc.**
- **Large businesses can also benefit from SB opportunities, and many are funded by the government**
- **Success with SB government direct and indirect funding requires innovation, persistence, and patience**

*(Oxygen / Methane Fuel Cell Engine Assembly) (Fuel Cells, Oxygen and Nitrogen Cells)*