Aeronautics Research and Technology Roundtable

Steven Pennington

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Statement of Task

The Aeronautics Research and Technology Roundtable (ARTR) convenes senior-most representatives from industry, universities and NASA to define and explore critical issues related to NASA's aeronautics research agenda that are of shared interest; to frame systems-level research issues; and to explore options for public-private partnerships that could support rapid, high confidence knowledge transfer. This forum will be designed to facilitate candid dialogue among participants, to foster greater partnership among the NASA-related aeronautics community, and, where appropriate, to carry awareness of consequences to the wider public.

Rules of the Roundtable

- **Convening activity: discussion-driven**
- **Does not produce reports or written products**
- **No consensus opinions or recommendations provided**

Past Key Questions Identified by NASA

1. What are the technical competencies for sustained leadership?
2. What are the most important aviation risks and opportunities for research focus?
3. What research is most effectively accomplished by public-private partnerships?

Areas of Interest

- Unmanned Aircraft Systems (UAS)
- Automation and Autonomy
  - Mod and Sim V+V* to speed certification
- Advanced Composites
- Public Agencies (NASA and DoD) Pathfinders

* “verification and validation”

Roundtable Membership

- **John J. Tracy**, (Chair) The Boeing Company
- **Ella M. Atkin**s, University of Michigan
- **Inderjit Chopra**, University of Maryland, College Park
- **R. Scott Dann**, General Atomics Aeronautical Systems, Inc.
- **George L. Donohue**, George Mason University
- **Alan H. Epstein**, NAE, Pratt & Whitney
- **Catherine Ferrie**, Bell Helicopter TEXTRON Inc.
- **M.E. Rhett Flater**, American Helicopter Society
- **Bruce J. Holmes**, NextGen AeroSciences, LLC
- **Margaret T. Jenny**, RTCA, Inc.
- **Ray O. Johnson**, Lockheed Martin Corporation
- **Charles E. Keegan**, Raytheon Company
- **Dale Klapmeier**, Cirrus Aircraft
- **Andrew Lacher**, MITRE Corporation
- **Robert G. Loewy**, NAE, Georgia Institute of Technology
- **Lourdes Quintana Maurice**, Federal Aviation Administration
- **Mark F. Miller**, Sikorsky Aircraft Corporation
- **M. Granger Morgan**, NAS, Carnegie Mellon University
- **David E. Parekh**, United Technologies Corporation
- **Steven Pennington**, U.S. Air Force
- **Eli Reshotko**, NAE, Case Western Reserve University
- **Thomas E. Romesser**, NAE, Northrop Grumman Aerospace Systems
- **Jeanne M. Rosario**, General Electric Company
- **Jaiwon Shin**, National Aeronautics and Space Administration
- **Edward Yarbrough**, Honeywell International

Two Recent Roundtable Meetings

- **June 18**
  - **Presentation of ARMD Strategic Direction**
    - **Positively received by ARTR. The plan has subsequently been featured in Aviation Week and other publications. Expectation is that more programmatic decisions will appear in the FY 2015 budget next February.**

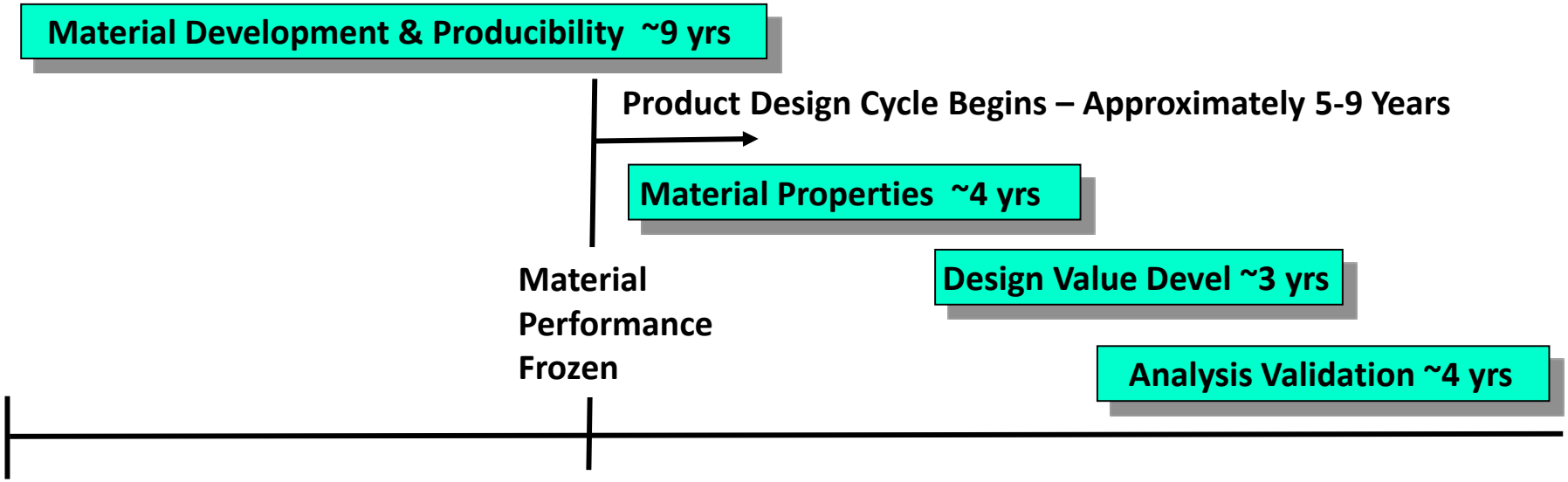
- **August 23**
  - **Meeting of Experts on NASA's Advanced Composites Project**
    - **Highly interactive meeting including a lot of discussion on a project still in early development stage. Assisting NASA in refining this project.**

Meeting of Experts on Advanced Composites

- **Core group of ARTR members, chaired by John Tracy, augmented with additional experts suggested by NASA.**
- **A looser format than other ARTR meetings, intended to provide more back-and-forth interaction on a narrow subject.**
- **Some future ARTR meetings can follow this format if desired. Provides an easy way to hold aeronautics “meetings of experts” without having to seek GBEC approval.**

Problem Statement

Timeline for development and certification of advanced composite materials and structures for aerospace approaches 20 years



WHY SLOW

- Complexity: parameters in construction; failure modes; variability
- Strength and life can not be predicted reliably
- Empirical and iterative 'trial and error' methods; lots of testing

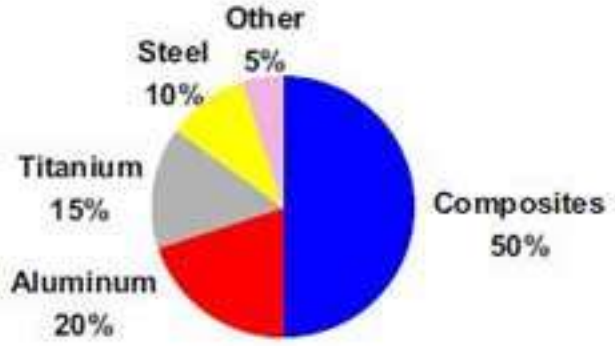
Inhibits vehicle innovation; Impacts national competitiveness

Composites in B787/GEnx Aircraft

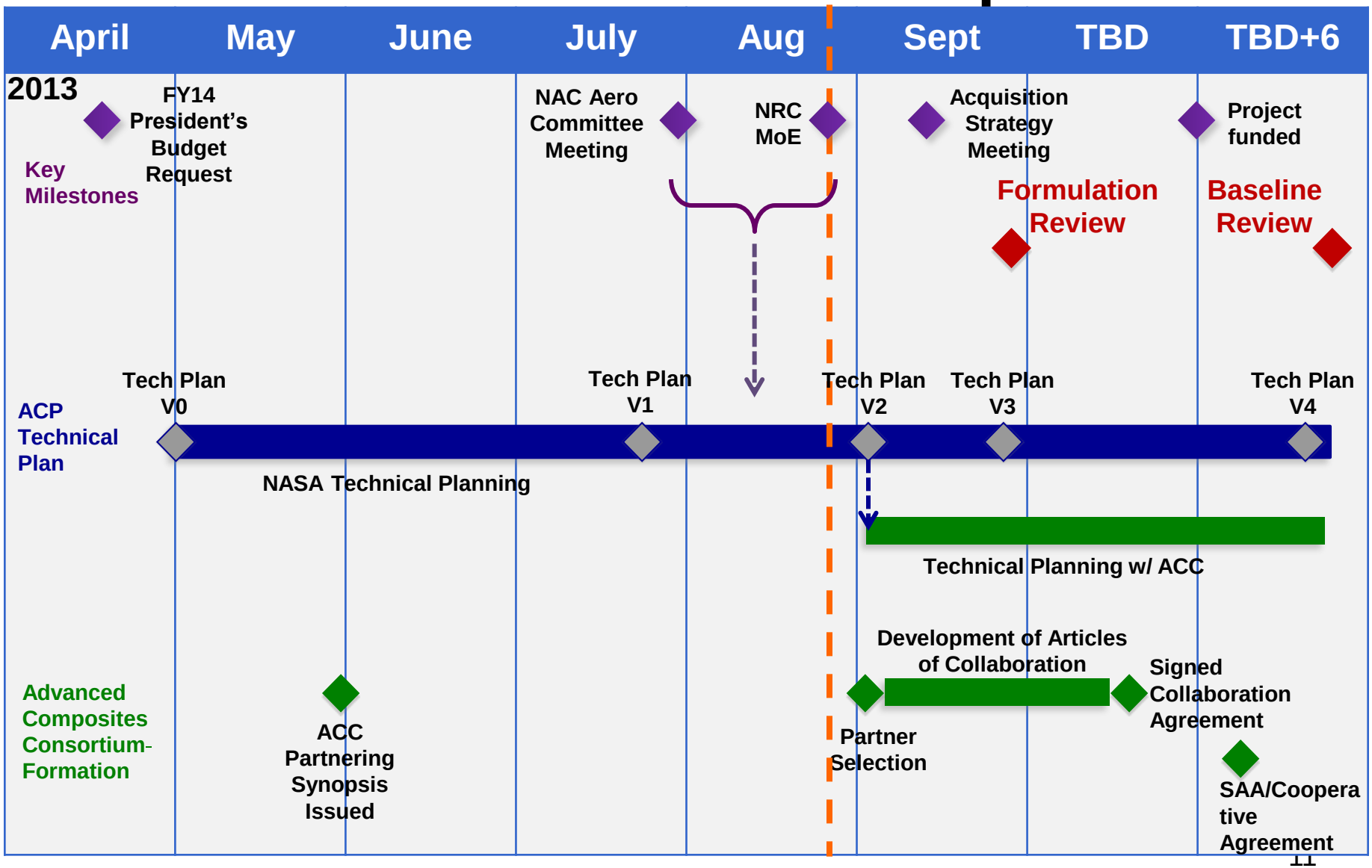
B787: 35 tons PMC

GEnx:
1.1 tons (x2)
PMC fan blades
and fan case

- Carbon laminate
- Carbon sandwich
- Fiberglass
- Aluminum
- Aluminum/steel/titanium pylons



Advanced Composites Program Formulation / Next Steps



Next Steps for ARTR

- **ARTR contract and membership expire early in 2014.**
- **NRC will negotiate with NASA for renewal of ARTR contract. Will probably expand the scope to include more meeting of experts activities. ARTR membership will change.**