Air Armament Center

War-Winning Capabilities…On Time, On Cost

U.S. AIR FORCE

AF Nonnuclear Munitions Safety Approval Process

An Overview

This presentation is cleared for public release

AF Nonnuclear Munitions Safety Approval Process

- Who: Melvin Duval, Chief, AAC/SES
- Where: AF System Safety Office, Air Armament Center
- Experience: 20 + years in acquisition at Eglin, Chief Engineer several times, ~6 years in AAC/SES
- What: Overview of what is needed for a successful Nonnuclear Munitions Safety Board (NNMSB) evaluation

Background

- System Safety begins at the inception of the program
- Acquisition management authorities need to ensure system safety is an integral part of the acquisition strategy. (AFI 91-202, Chapter 9 and AFI 91-205)
- The AAC System Safety Office (AAC/SES) is primary AF source of conventional munition safety expertise
  - Ensuring program design safety requirements
  - Assisting in defining contractual system safety requirements
  - Supporting the systems engineering processes
  - Evaluating and documenting design as required for NNMSB safety approval/ certification actions for all conventional munition systems

Background

- NNMSB Core Mission
  - Review Authority and System Safety Group for All USAF Conventional Munitions
  - Advisor to Acquisition Authorities on Design Safety and Qualification Issues
  - Approval Authority for Airborne Flight Testing of Uncertified, Live-Loaded Munitions and Associated Subsystems
  - Design Safety Certification Authority for all Air Force Conventional Munitions
- AAC/SES, as NNMSB Executive Secretariat, assures execution of the Board's Core Mission

Background

- Authority rests with AFI 91-205
- Chairperson: Chief, Weapons Safety Division, Hq AF Safety Center
- Membership:

Air Combat Command	AF Materiel Command
Air Mobility Command	AF Operational T&E Center
AF Special Operations Command	Air Education & Training Cmd
Pacific Air Forces	Air National Guard
USAF Europe	AF Reserve Command
Air Force Space Command	Global Strike Command

- AFI 91-205 also designates AAC/SES, through Hq AFMC, as the agency to provide the Technical Support of the NNMSB

USAF Nonnuclear Munitions Safety Board AAC/SES Role

- AAC/SES is the Engineering Arm of the NNMSB
  - Performs Hazard Analyses
  - Performs Independent Fault Tree Analyses
  - Generates Safety Studies for assigned systems
  - Briefs the Safety Studies to the NNMSB
  - Obtains Approval for Live Flight Test/ Recommendation for Certification for Operational Use
- SES is part of the systems engineering team and will work with you from the start of the program through all milestones

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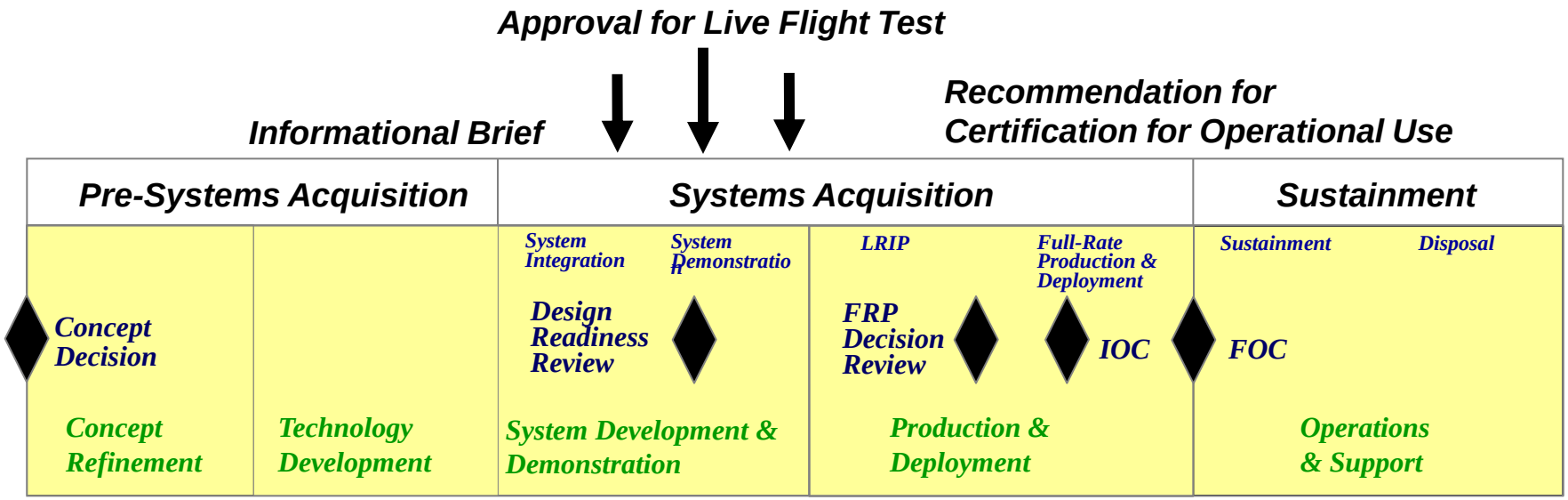

- Meeting the NNMSB is event driven, not milestone
- NNMSB scheduled Boards are April and October
- Special Boards can be held out of cycle if required
- Funding required for Board members' TDYs

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- First meeting with the Board is informational brief
- Scheduled 6 to 12 months before first live flight test
- Informational brief given by contractor in most cases
- Content is high level with specifics on safety aspects
- Feedback from the board will be comments on design, implementation, handling and storage
- Outcome will be concept agreement, subject to implementation

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- Second meeting with the Board is live flight test
- Live flight test includes live fuze, warhead, rocket motor, live Flight Termination System (FTS) or combination thereof
  - Live FTS has Range Safety and System Safety aspects
- Called Test Hazards Assessment Review (THAR)
  - THAR written by and presented to NNMSB by SES
  - THAR goes to NNMSB 30 days ahead of review
  - SES prep typically 30 days – Data in by 60 days ahead
  - Serial fashion is best – Don’t wait for complete package
  - Must be approved by NNMSB for test to proceed

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- Third meeting with the Board is operational use
- Occurs after all testing is complete with no safety related failures – Can be held with minimal work left to conduct
- Documented by Technical Munitions Safety Study (TMSS) and in some cases by Munitions Safety Analysis for non-complex items – Time line is the same as THAR
- TMSS generated by and presented to NNMSB by SES
- Outcome is recommendation for certification for operational use by the NNMSB – May result in action items

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- For joint programs, SES will work with Service System Safety Counterparts to coordinate with and support review milestones, including formal Joint Meetings of the Boards
  - Key Distinction—There is no “Joint Board”
- Service Counterparts are invited to any review they have need to attend
- Can be informational or formal depending on requirements

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- What is important to know about the SES approach?
  - Primary desire is for concrete understanding of all safety critical elements of system, subsystem and components including:
    - Clear and detailed comprehension of design
    - What the hazards are to personnel/ property
    - Who will use the system and how they will use it
  - Is an iterative process - “Come Early, Come Often”
    - The earlier we understand your system, the better we can help you through the process

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- What is important to know about the SES approach? (cont)
- No formal submission guidelines or format requirements
- Emphasis is on technical content, not format
- Technical content is basically the same as for other service Boards and for a well prepared Safety Assessment Report – makes a good data transfer vehicle
  - Well defined/detailed physical/functional description
  - Full schematic diagrams of adequately mature design
  - Well defined/documented safety analyses
  - Well defined/documented safety specific testing
  - Well defined/documented system/subsystem testing

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- What to do to maximize your probability of a successful NNMSB?
  - Provide clear schedule requirements for program
  - Provide adequate information on system
  - Provide information in a timely manner
  - Provide technical support to Fault Tree Analysis
  - Provide support at the NNMSB Meeting
  - Respond to input from SES and the NNMSB
  - Notify AAC/SES of Program Changes ASAP
  - Work issues in real time -- No Surprises!!

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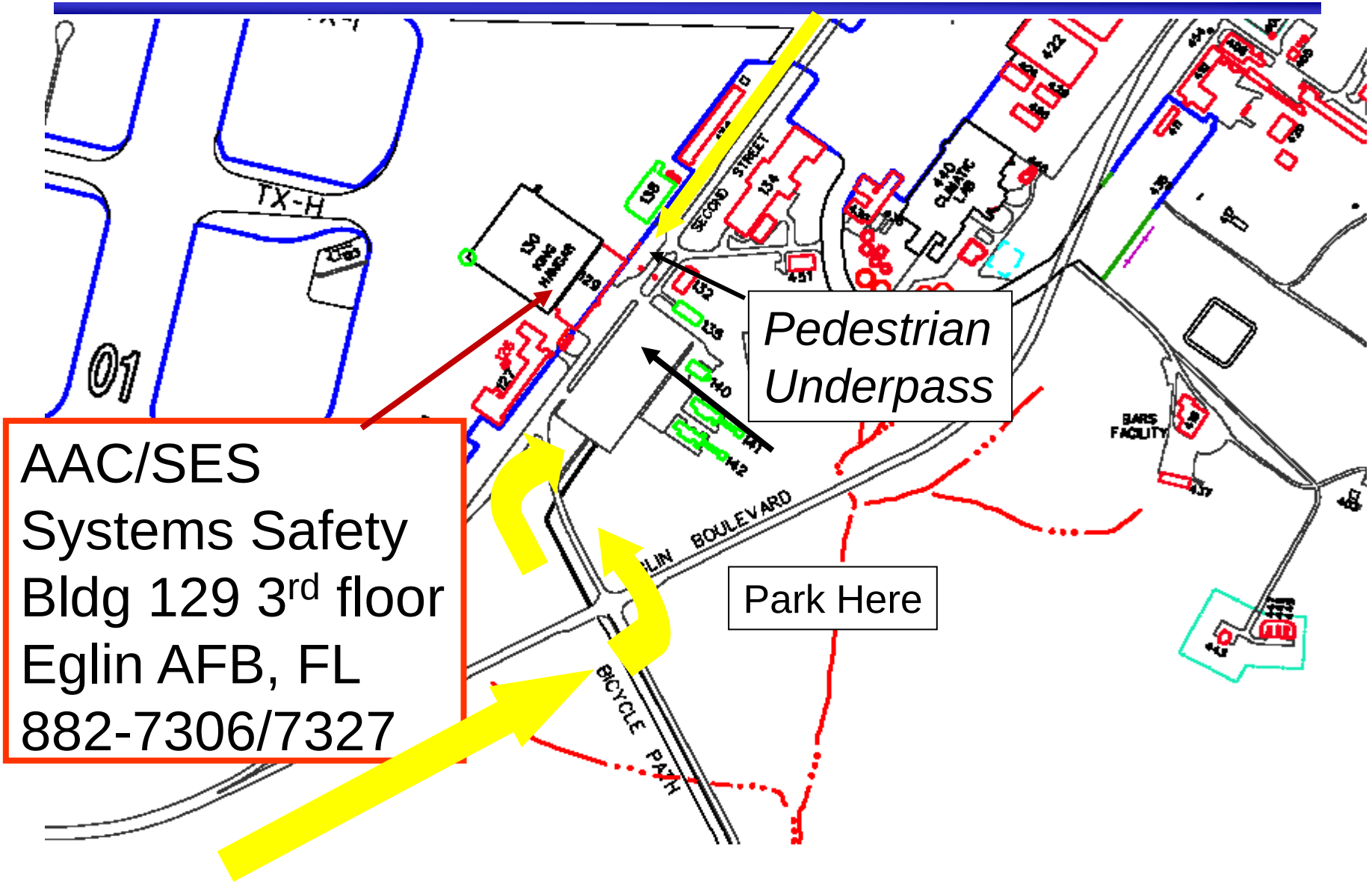
- As said before, our motto is “Come Early, Come Often”
  - Contact assigned engineer and set up informal and formal review times/dates
  - Be prepared to discuss the system at the lowest levels – Typically with the designer
  - Be prepared to discuss all hazards of the system
  - Be aware you are not the only one wanting a review, so plan ahead and have back-up dates ready

USAF Systems Safety Location



Questions…