NIAG 117

Future Fuze Safety and Arming Technologies and Implications

Fuzing Timelines and Operational Sequencing

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NIAG 117 Thrust: Standardization

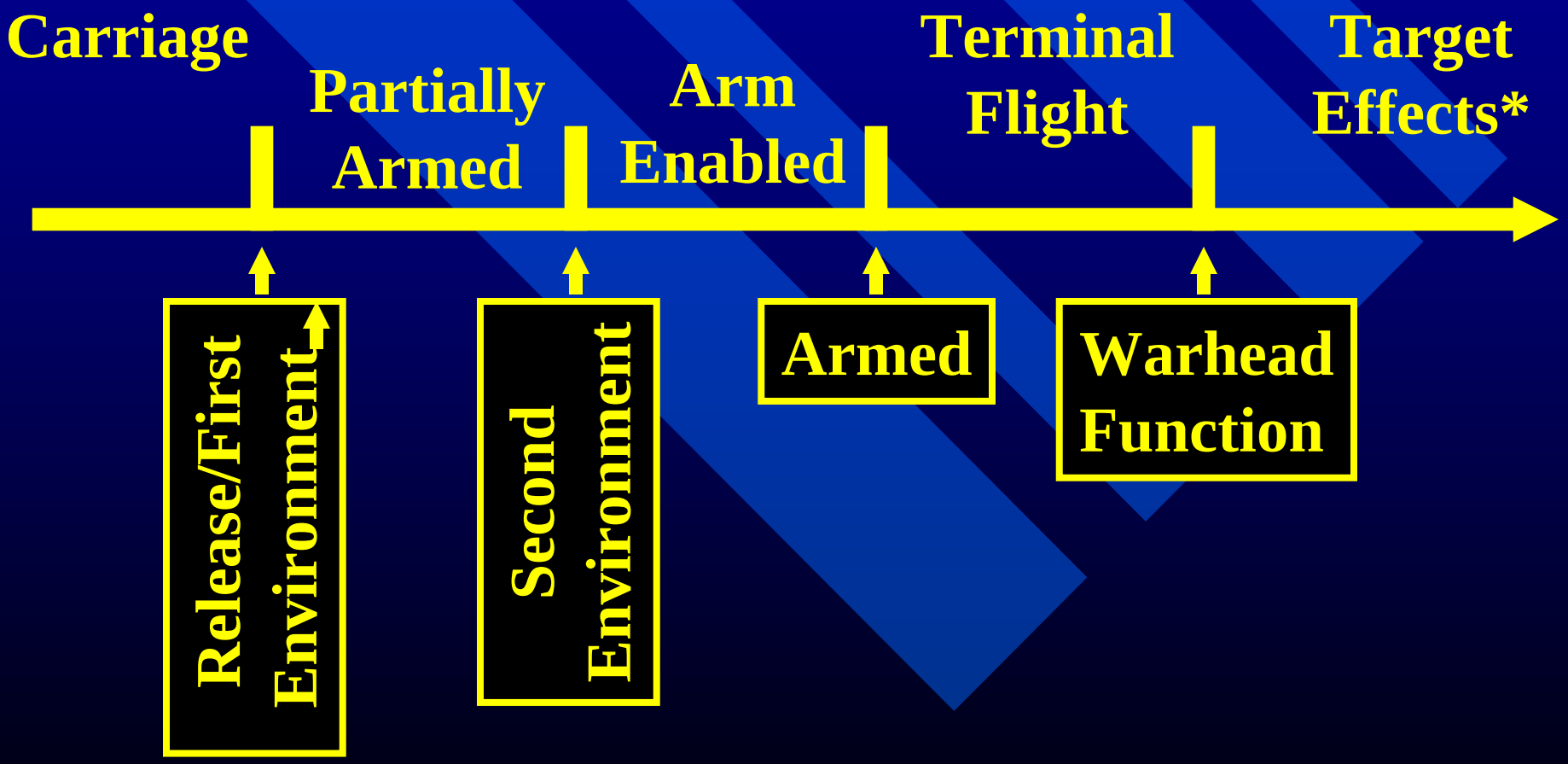
- Review of current standards – up to post launch separation.
- Requirements for new standards – beyond post launch separation.

Examining classic and evolving requirements and life cycle elements to which Fuze Systems are exposed.

NATO Industrial Advisory Group 117

- Follows Previous NIAG Study SG 89 Which Examined Future Fuzing Technologies For Air Launched Weapons For Ground Targets
- Reviewing Current International, NATO And National Standards Related To Fuze Safety And Arming
- Examining Applicable Enabling Architecture Technologies In Relation To Current Standards
- Identifying the Impact Of New Technologies On These Standards And Will Make Proposals For Changes to NATO Standards
- Liaising With National Safety Approval Authorities.

Simplified Timeline for Air Delivered Weapons



* Including Collateral Damage

Fuzing Within the Weapon System "What Struck Us"

Fuzing can not be considered -if it ever truly could- in isolation from the overall weapon system and the overall system operational sequence

- **Arming and Rearming**
- **Programmability**
- **Guidance Integrated Fuzing**
- **Use on Unmanned Aerial Vehicles**
- **Expanded Safety and Enhanced Reliability Requirements**
- **Focus on Unexploded Ordnance and Explosive Remnants of War**

Continuum Of Weapon Complexities

•Non-Complex Gravity Bombs

- Unguided
- Impact Detonating
- Released From Manned Aircraft
- Blast/Frag Warheads

Higher Complexity

Very Complex Cruise Missiles

- Precise Guidance
- Powered/ Large Standoff
- Hard Target, Void Sensing
- Proximity Sensors
- Data Links, etc.

Complex Guided Weapons

- Precise Guidance
- Large Standoff
- Hard Target, Void Sensing
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- Manned and Unmanned A/C
- Networked, etc.

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Increased Expectations To Decrease Collateral Damage and ERW

Definition of Fuzing System STANAG 4187

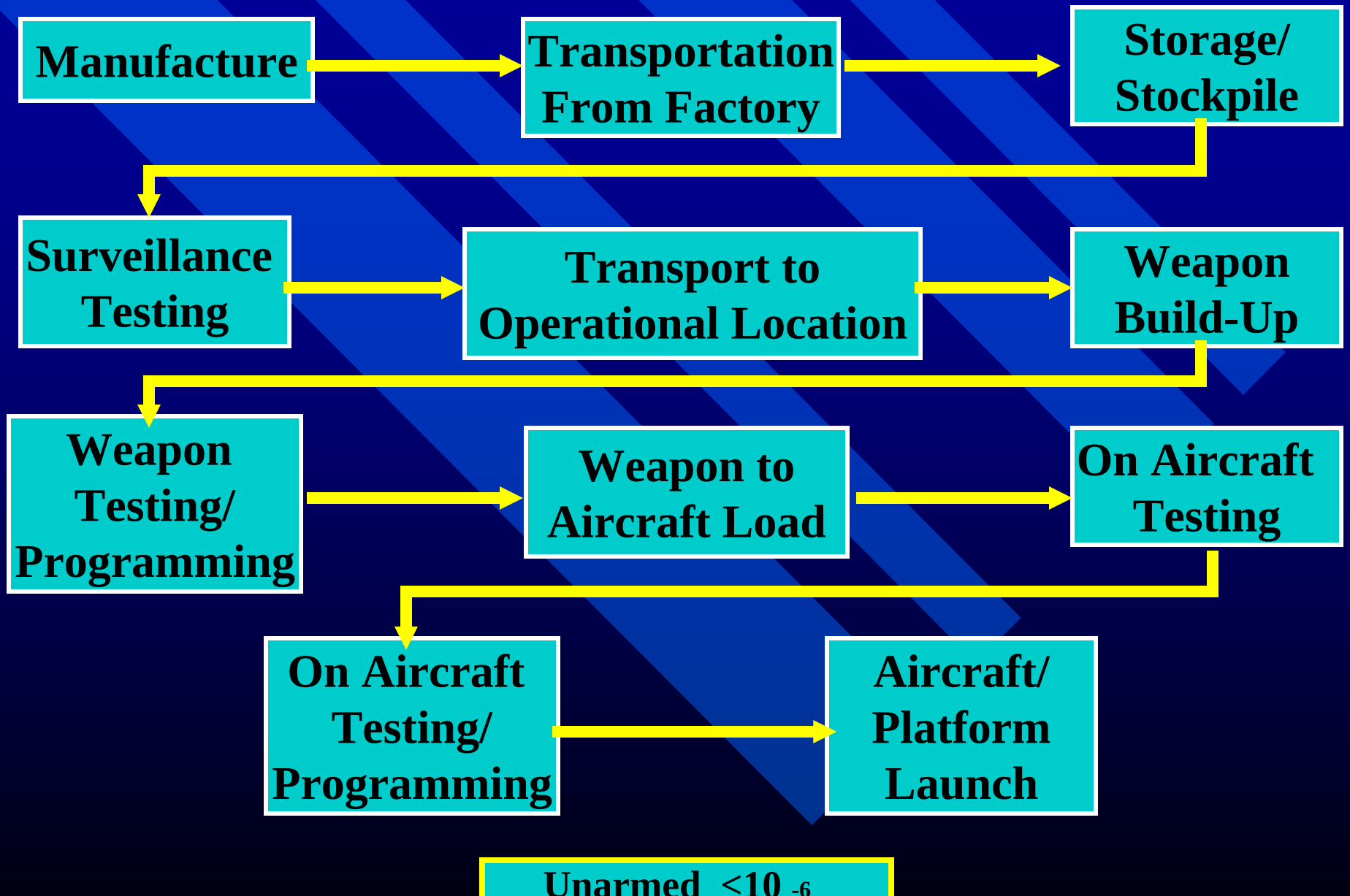
- Ensures the safety of the initiation system of the munition payload throughout the logistic phases and operational usage as well as testing and inspection.
- Recognizes or determines the circumstances under which the munition payload is intended to function.
- Enables and initiates the munition's payload.
- Where applicable, recognizes or determines the circumstances under which the munition payload is intended to be de-armed, sterilized, or to self-destruct."

Fuze System Life Cycle Environments

- Pre-Carriage
- Captive Carriage and Return
- Launch and Free Flight
- Post Impact

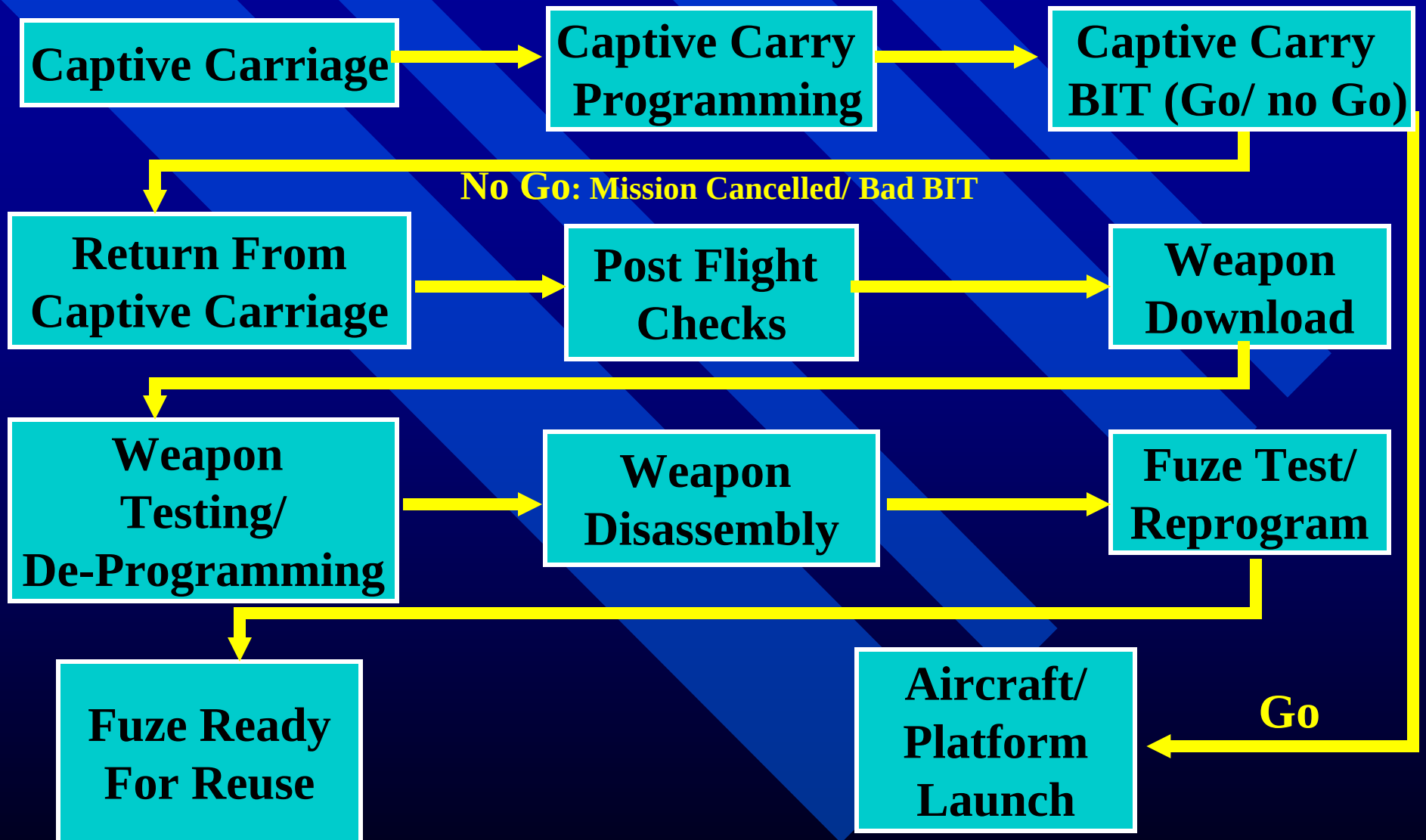
Safety Is Of Utmost Criticality Throughout The Entire Fuze Life Cycle

Pre-carriage Environments



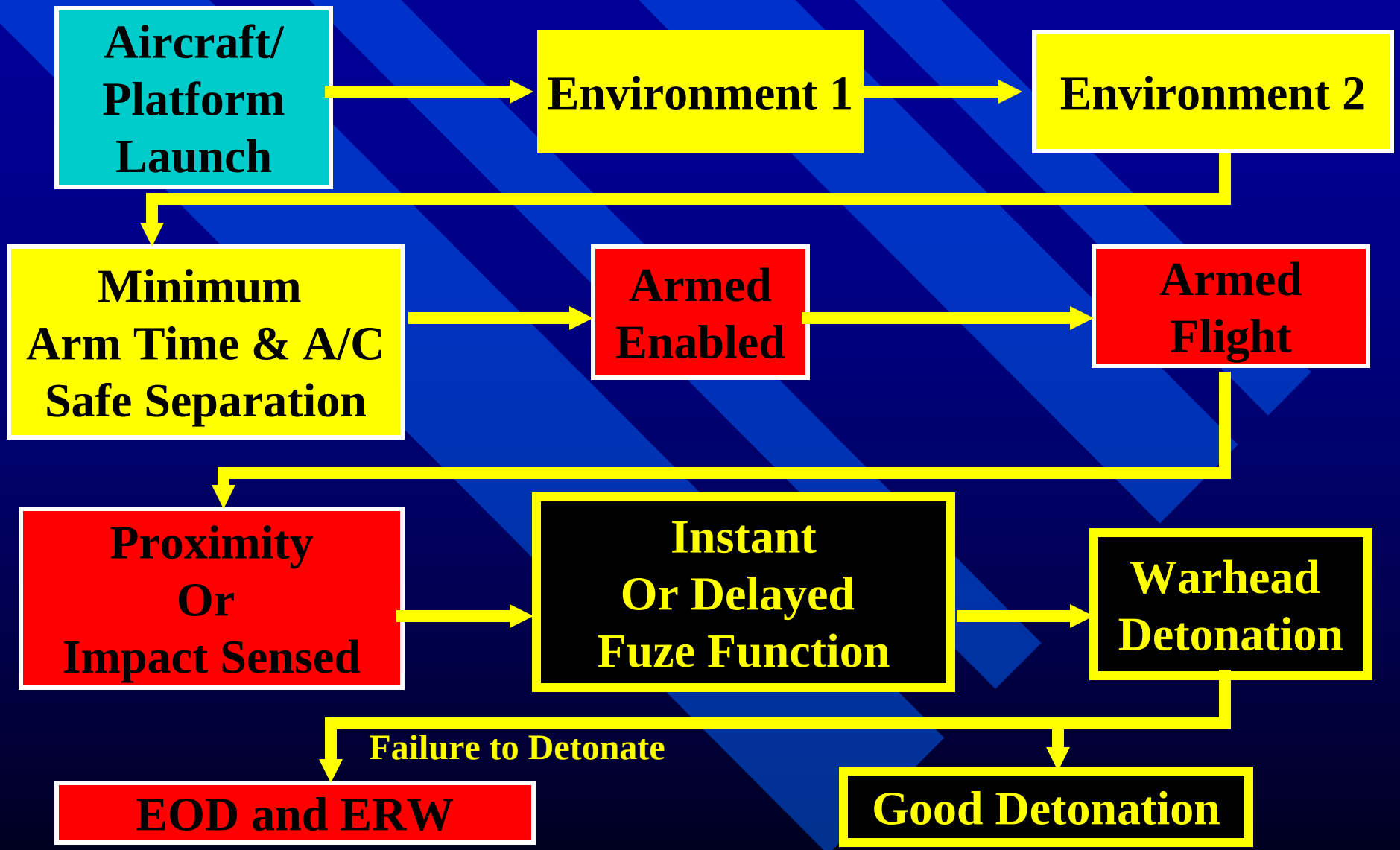
Unarmed $<10^{-6}$

Captive Carriage and Release

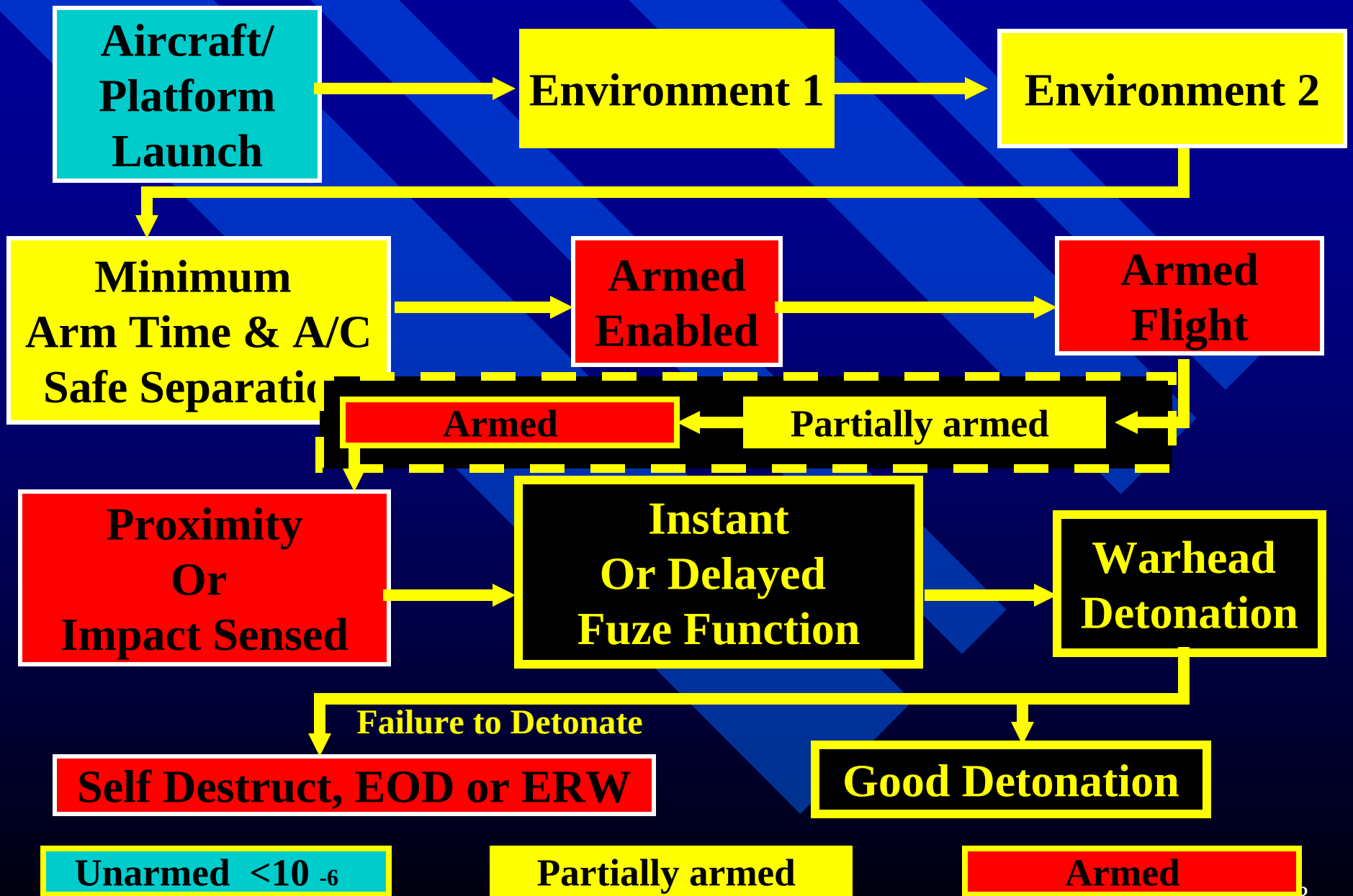


Unarmed $<10^{-6}$

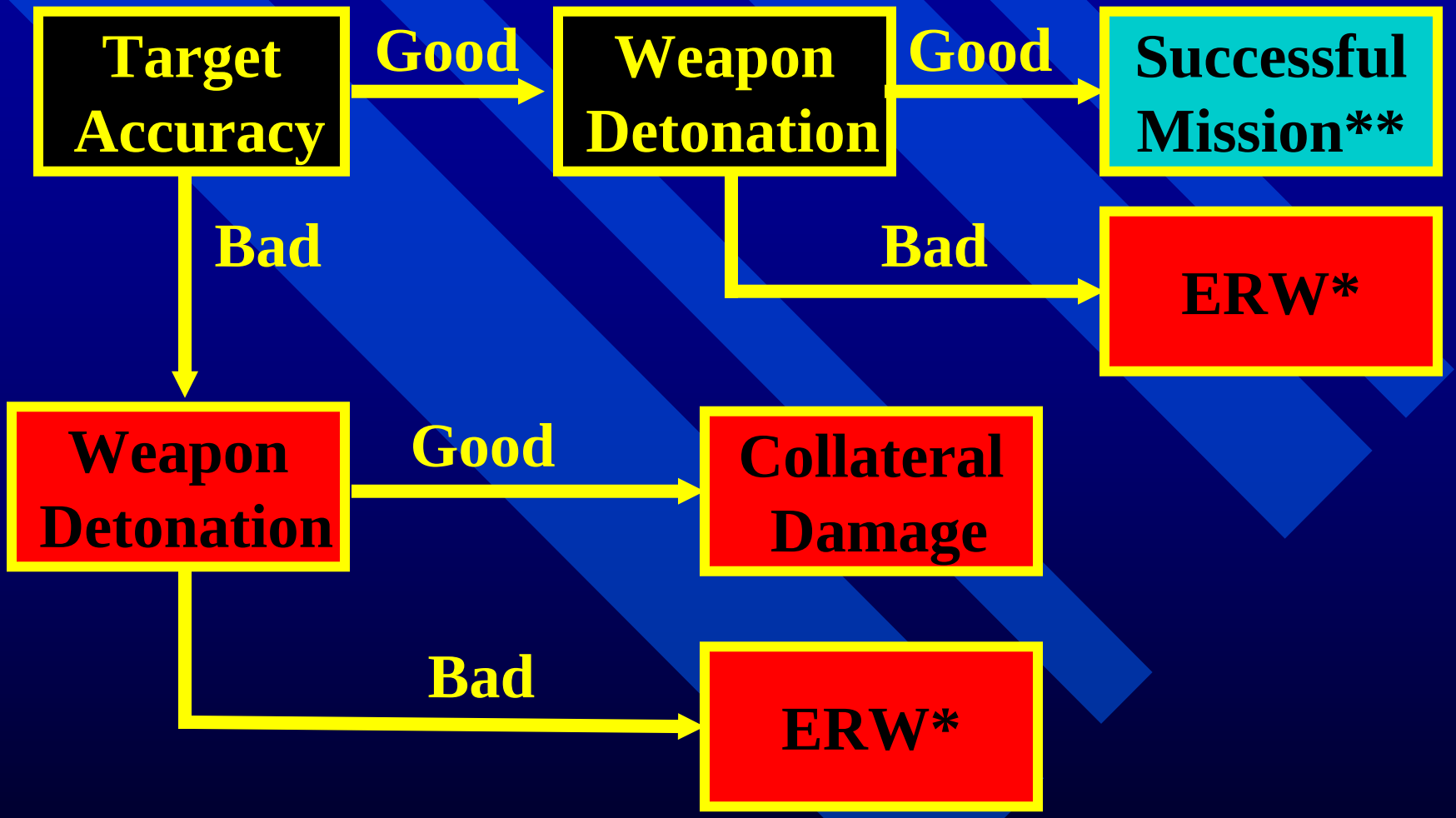
Launch and Free Flight- Typical



Launch and Free Flight- With Data Link



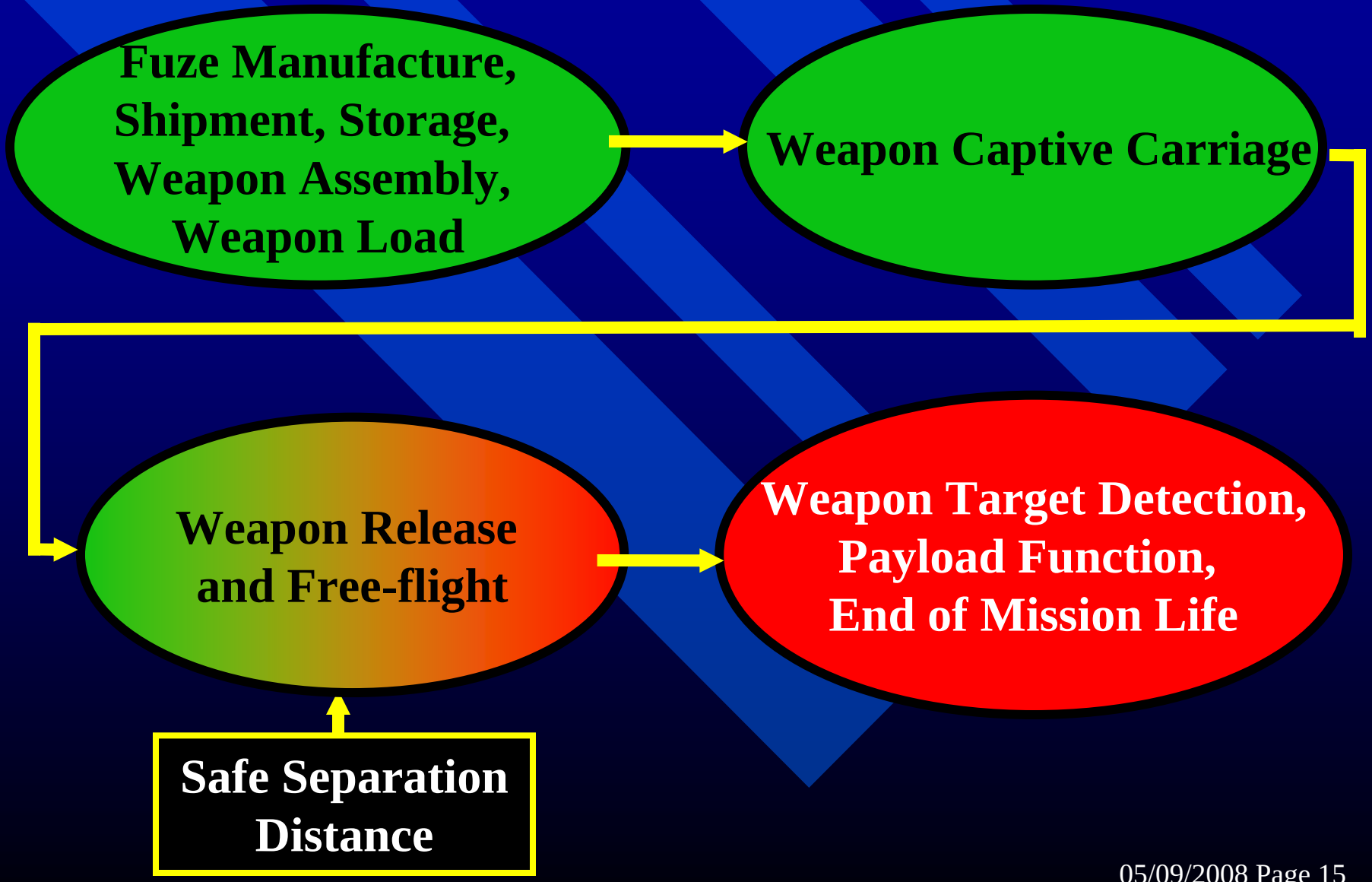
Post Impact Considerations



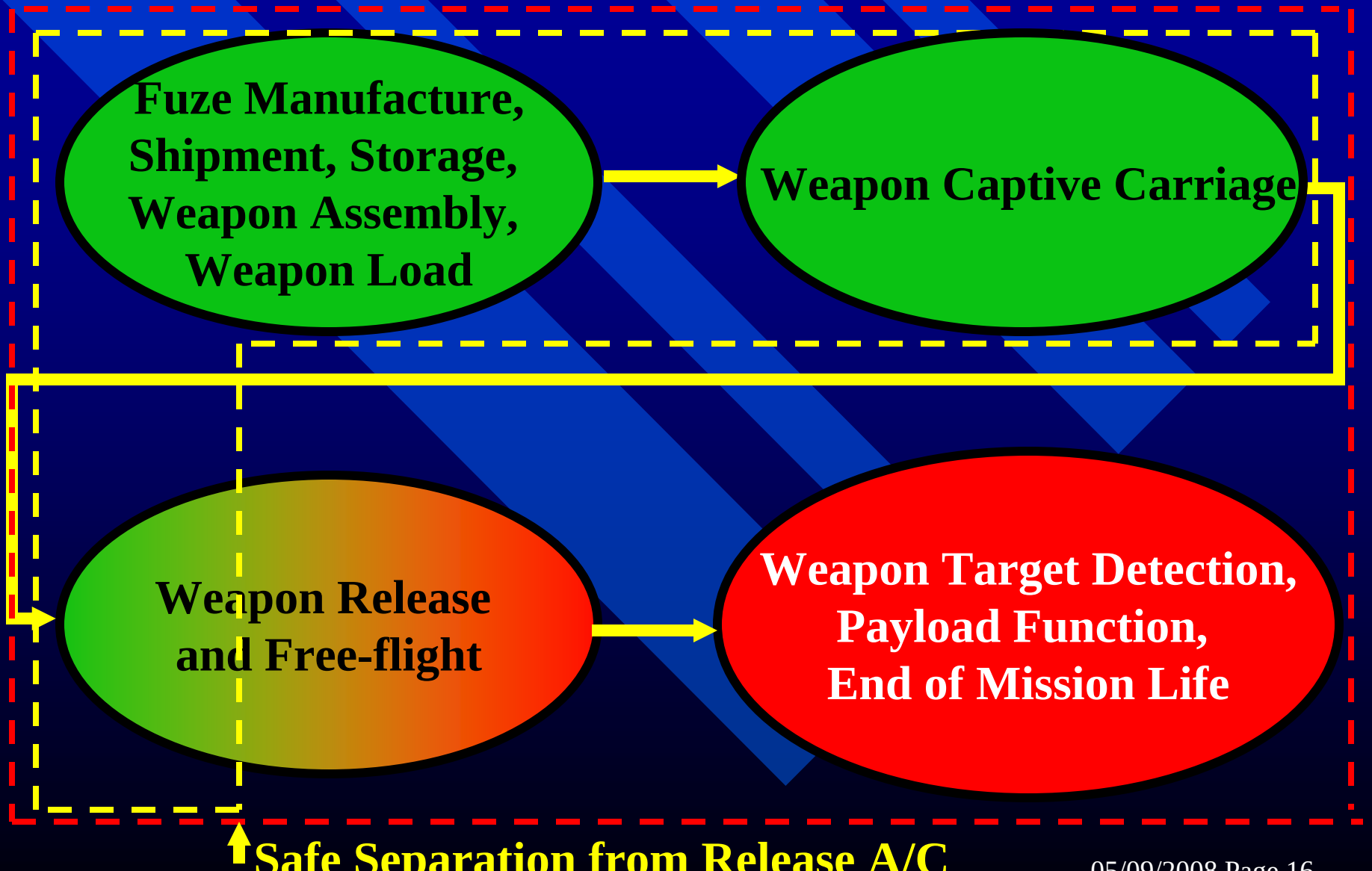
* With or Without Self Destruct

** Future Post Impact Information

Safety/Hazard Levels Must Be Maintained at <10-6th Until Safe Distance from Manned Aircraft



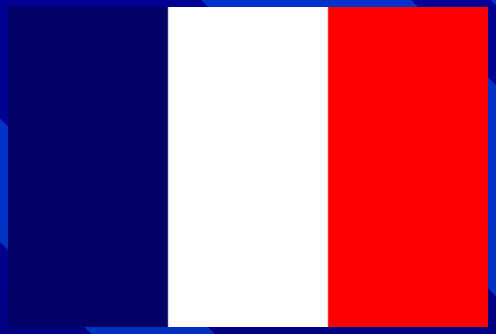
Safety/Hazard Levels Defined in STANAG 4187, Required Safety Hazard Levels vs Specified Reliability



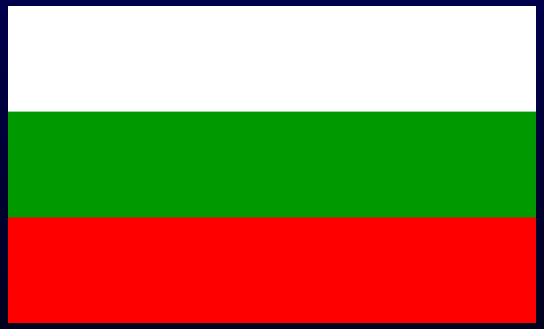
Summary

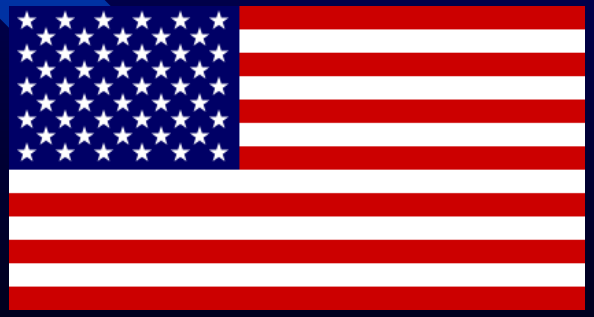
- NIAG 117 Very Active In Reviewing Existing STANAGs For Evolving Fuzing Requirements
  - Recommendations Forthcoming In The Near Future
- Fuzing Must Be Considered From A Total Weapon System Perspective
  - Future Fuzing To Face A Continuum Of System Complexities And Very Diverse Release Platforms
- Current Fuze System Safety Requirements Focus On System Safety Up Through Release Platform Safe Separation Distance
- Growing Expectations To Consider Unexploded Ordnance And Explosive Remnants Of War

Questions?





Backups