



NDIA Joint Ground Robotics Update

“The Top 10”

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JGRE #1



- **Integrated Unmanned Systems Roadmap**
 - **Future Vision ... what do the future**
 - **Unmanned System Portfolios look like?**
 - **J AUS**
 - **Strengths/Opportunities**
 - **Challenges/Risks**



Addressing Capability Needs via Unmanned “Means” (notional)



2009

2034

| | |
|---|---|
| <p>JCA 1- Battlespace Awareness</p> | <p>RECONNAISSANCE-UAS</p> <p>MAN-PORTABLE EOD-UGV</p> <p>GLOBAL HAWK-UAS</p> <p>SIGINT COLLECTION-UAS</p> <p>INFORMATION OPERATIONS-UUS</p> |
| <p>JCA 4- Force Application</p> | <p>TACTICAL STRIKE-UAS</p> <p>MINE WARFARE-USV</p> <p>PENETRATING STRIKE-UAS</p> <p>INTEGRATED STRIKE-UAS</p> <p>TIME CRITICAL STRIKE-UUS</p> |
| <p>JCA 5- Protection</p> | <p>MARITIME PATROL-UUS</p> <p>HULL UUV LOCALIZATION SYSTEM-UUV</p> <p>ACTIVE RANGE CLEARANCE-UGV</p> <p>MINE NEUTRALIZATION-UGV</p> <p>MULE-UGV</p> <p>SUGV-UGV</p> <p>COUNTERAIR-UAS</p> |
| <p>JCA 6- Logistics</p> | <p>CONVOY OPERATIONS-UGV</p> <p>AERIAL REFUELING-UAS</p> <p>MANUEVER SUPPORT & SUSTAINMENT-UGV</p> <p>MULE-UGV</p> <p>AIRLIFT-UAS</p> |



Unmanned Systems Technology Enablers (notional)



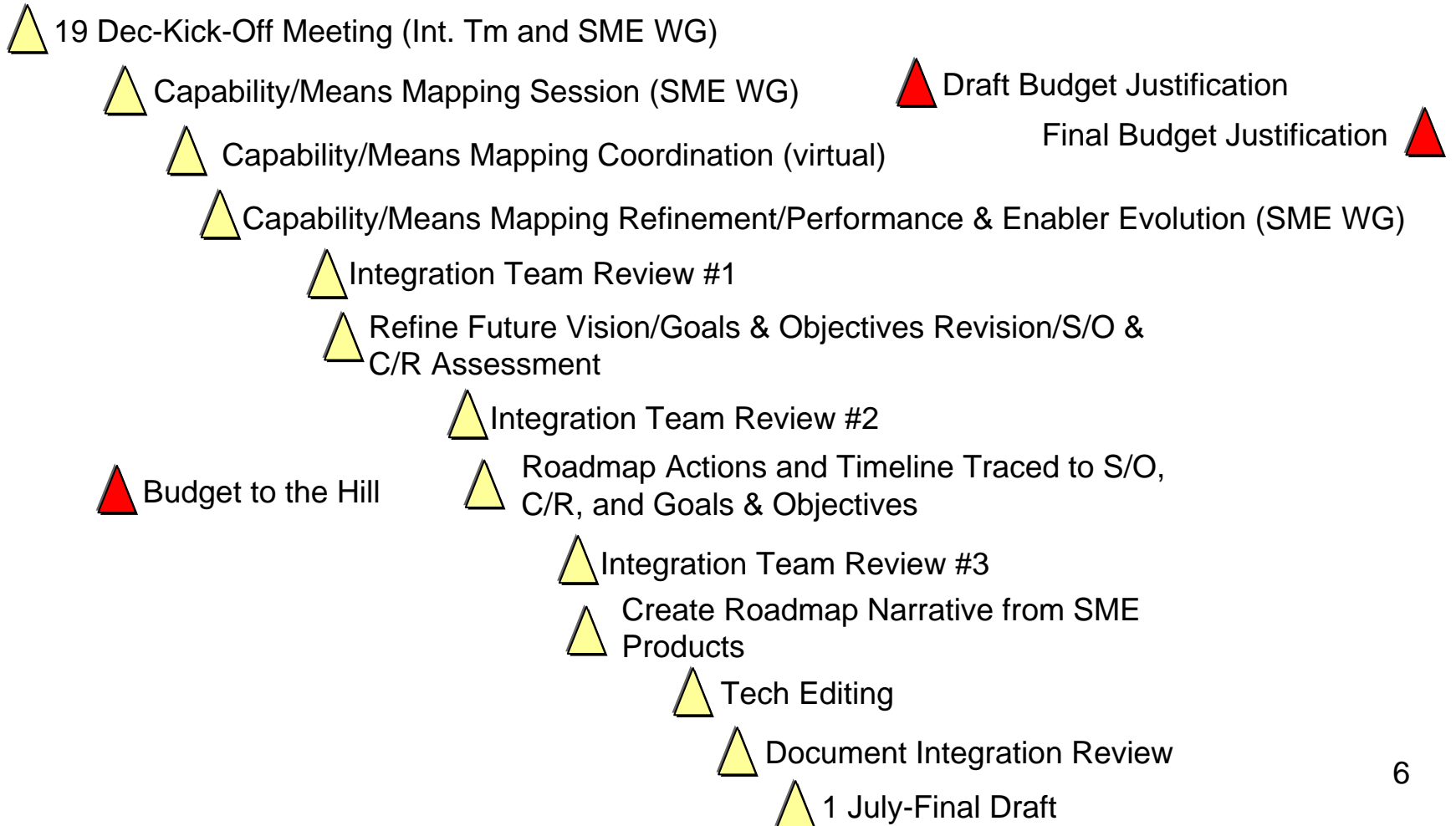
| | | | |
|----------------------------------|-----------------------|-----------|---------------------------------|
| Battery Powered | Hybrid Electric | Fuel Cell | Solar Powered |
| Spectrum Constrained RF | Frequency Hopping | | Non-RF Comms |
| Mild Weather | | | All Weather |
| Passive Signature Management | | | Active Signature Management |
| Architecture Proprietary/Limited | Architecture Standard | | Architecture Standard Unlimited |



Roadmap “Battle Rhythm” FY08-FY09



Dec Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec

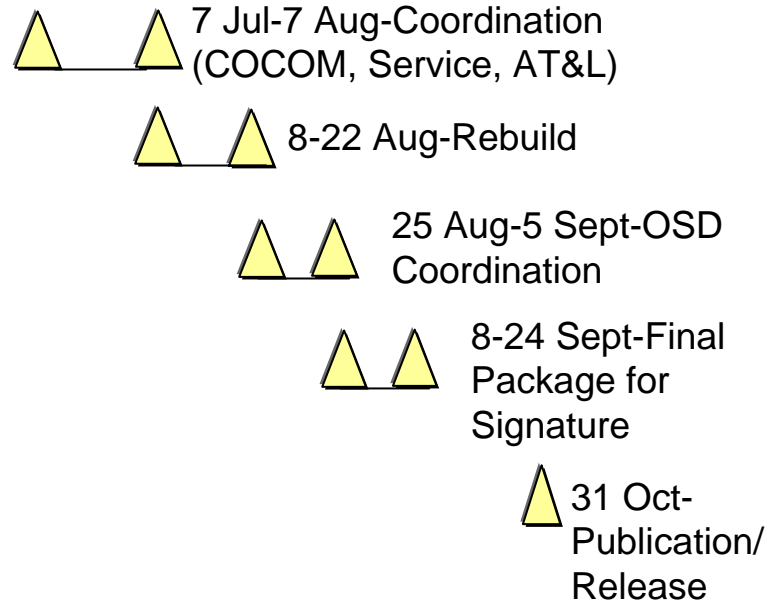




Roadmap “Battle Rhythm” FY08-FY09 (continued)



Dec Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec



Appropriations

Authorizations



JGRE #2



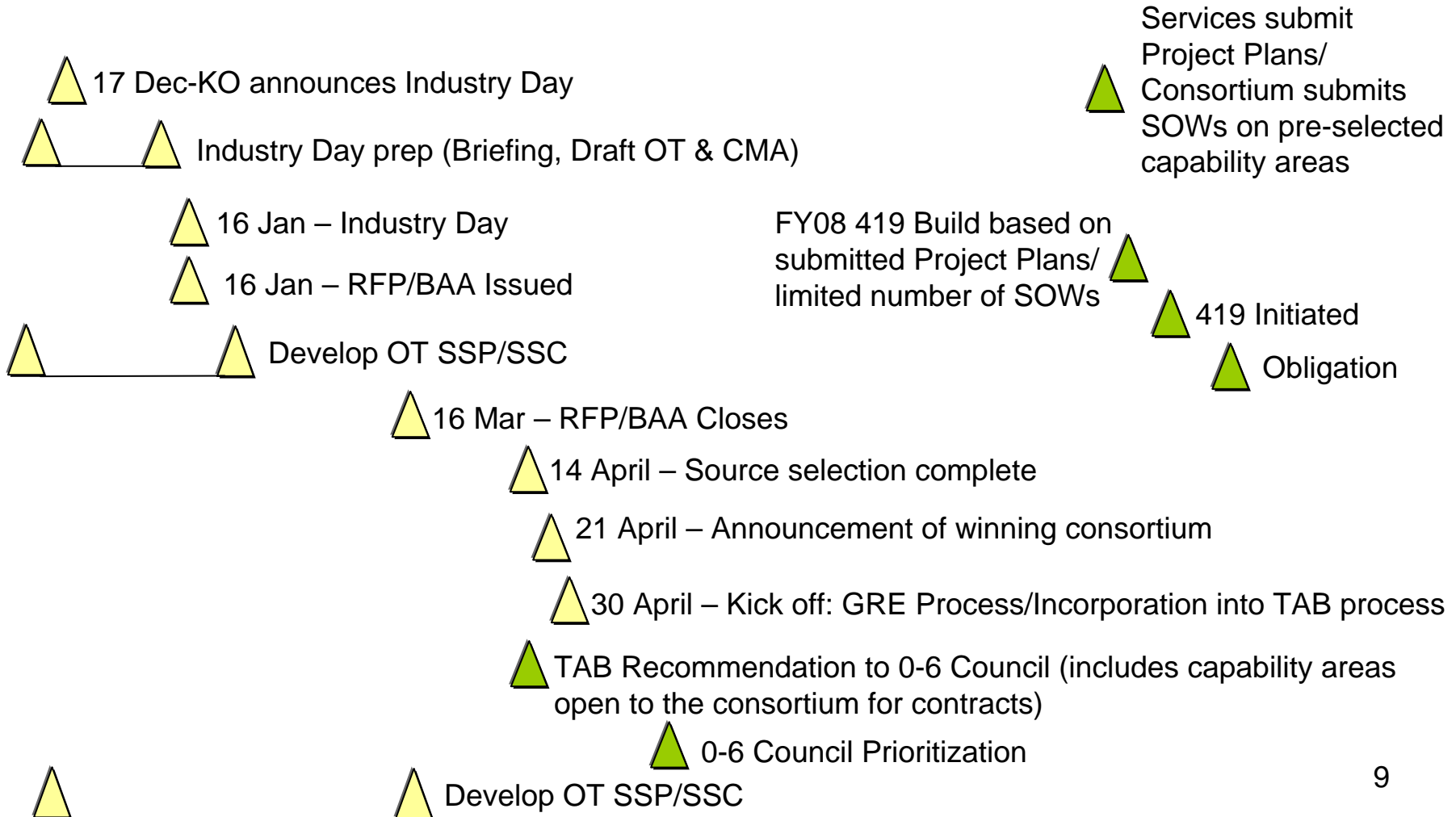
- **Consortium**
 - **Industry critical mass to establish consortium**
 - **Planning and execution process for FY08**
 - **Planning and execution process for FY09 and beyond**



Consortium “Battle Rhythm” First Year

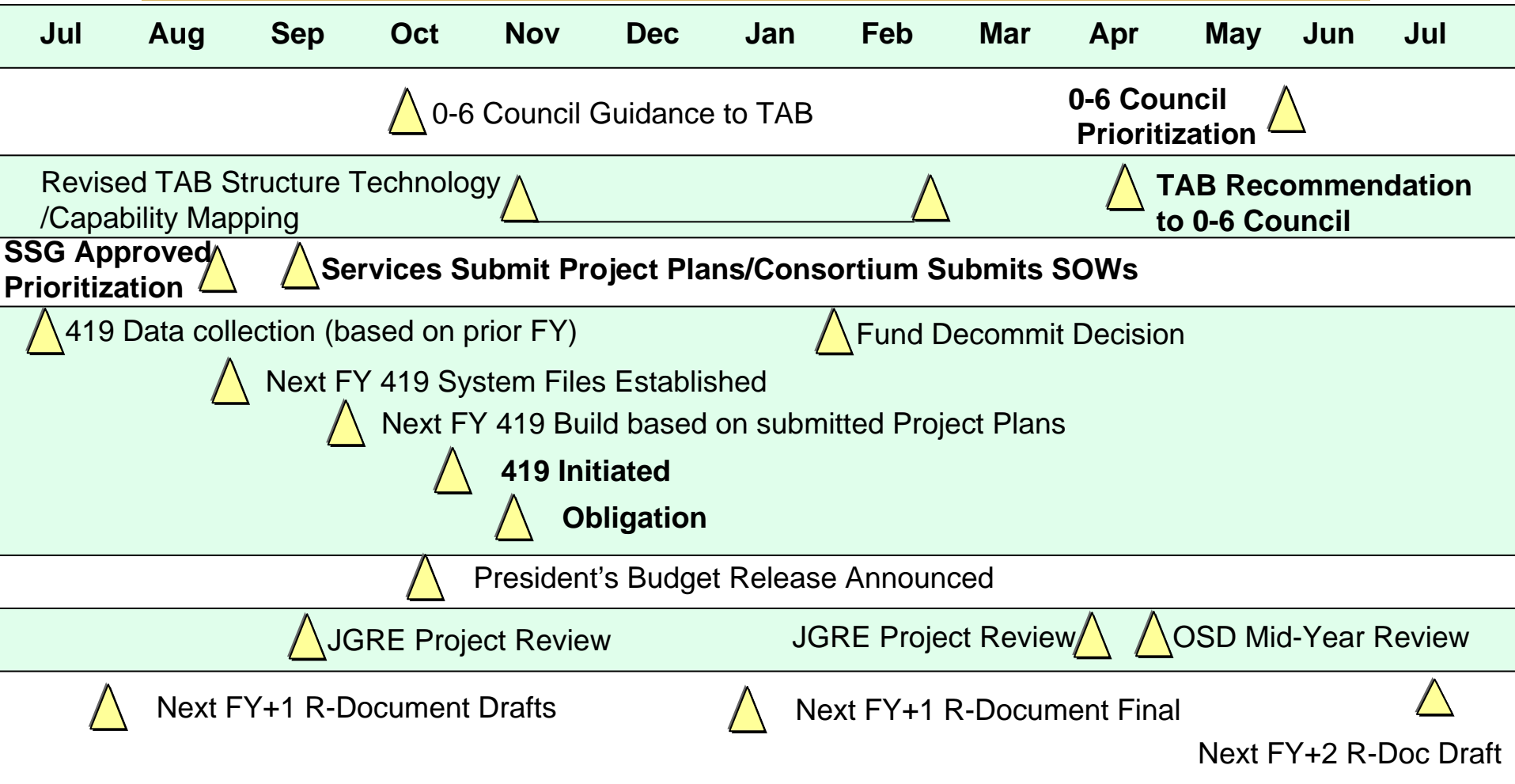


Dec Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec





GRE “Battle Rhythm”



| | | | | | | | | | | | | |
|---------------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Obligation | (First year | 8% | 16% | 24% | 33% | 41% | 49% | 57% | 65% | 73% | 81% | |
| Disbursement | metrics) | 5% | 9% | 14% | 19% | 23% | 28% | 32% | 37% | 42% | 46% | |
| Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul |



JGRE #3



- **Test Implications**

- Are we ready to test ground robots (infrastructure, e-stop, GPS coverage, wireless data collection, etc.)?
- What are Test Operating Procedures for characterizing robotic performance (how do I generate compelling evidence for which is the best mechanism for traversing complex terrain (e.g. legs or tracks))?
- Can we leverage robots to support tests (e.g. autonomous threats, targets, logistics support, etc.)?



Test Standards and Instrumentation



- E-Stops, data logging, position

- Standard Test Methods, Metrics





JGRE #4-6



- **WarFighter Experimentation**
 - Collaboration between Combatant Command and Combat Developer
 - Institutional process for experimentation to underpin requirements analysis for “game changing” robotic technologies
- **SUGV Product Line Portfolio**
 - MTRS
 - Advanced EOD Robotic System
 - Blow-in Place “Bots” for Engineers
 - FCS SUGVs (Block 1, Spin Out 3, Core)
- **International Engagement**
 - UK-Grand Challenge
 - Germany-ELROB (European Land Robotics)



JGRE #7-10



- **Armed Ground Robots**
 - Are technology advances outpacing policy, rules of engagement, statute?
- **Homeland Defense and Homeland Security**
 - Better partnering between OGAs to achieve mutual benefit and efficiencies.
 - Implications of using DoD robotic capabilities on US soil (airspace, weapons, safety, spectrum, etc.)
- **Congressional Interest in Robotics**
 - Robotic Caucus
 - Legislative proposal and implications of adoption/lack of adoption
- **Earmarks and unrequested funding**
 - Future policies
 - What DoD can and cannot do legally



JGRE Top 10



- **Each Top 10 issue represents an area of engagement for OSD**
- **Some Top 10 issues may warrant new DoD Policy**
- **Resolution of some Top 10 issues may result in actions captured in the Integrated Unmanned System Roadmap**