Integrated Trailer-ECU-Generator (ITEG)

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WHY ARE WE HERE ?

Family of Generators
2 – 100 kW

Family of Trailers
HMMWV, MTVR, LVS

Family of ECUs
9K – 96K BTU/hr

But all three can not be mated and HMMWV towed

(with sufficient power and cooling capacity)

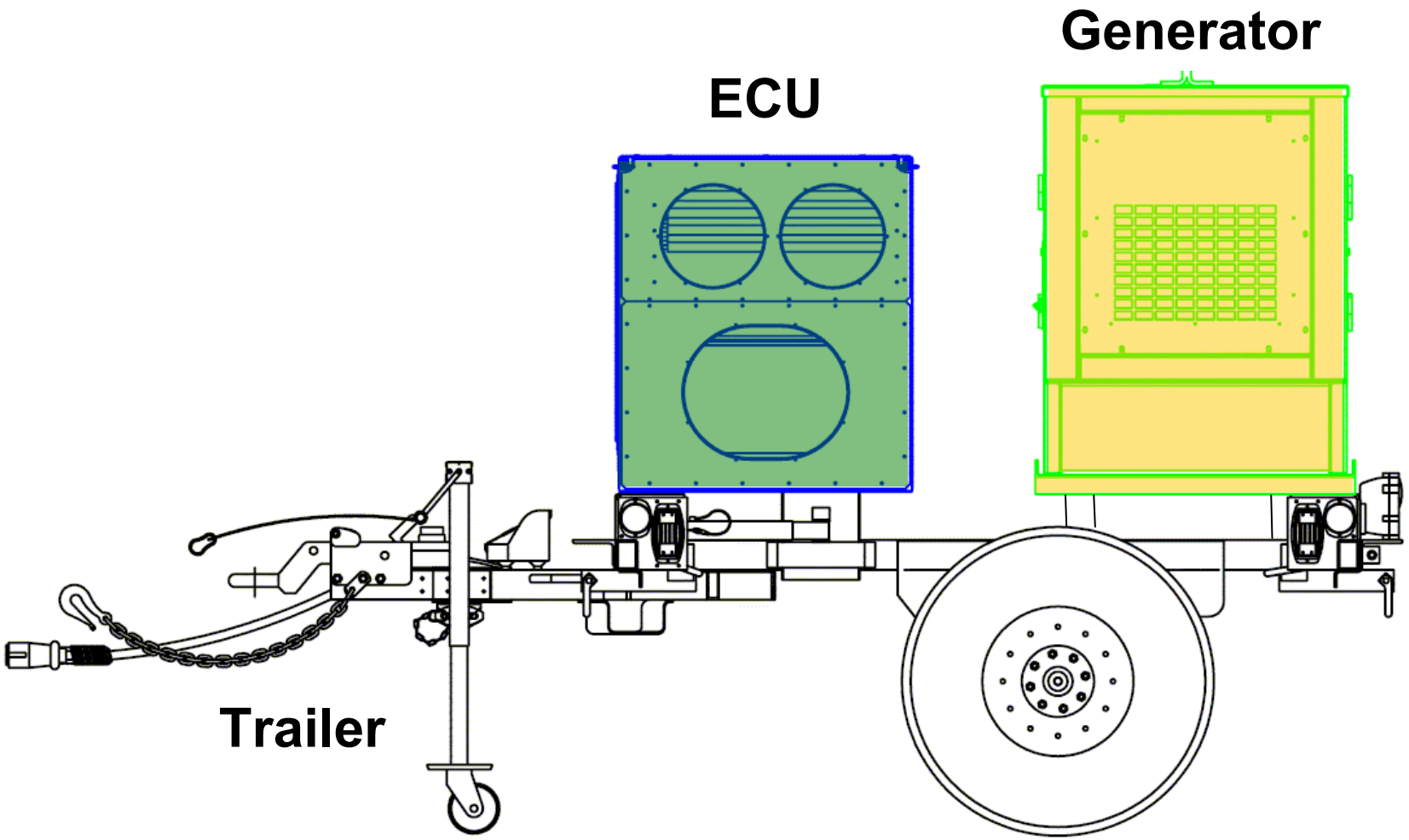
AGENDA

- ITEG Definition
- Requirement
- History of ITEG Development Efforts
- Current ITEG Effort
- ITEG Supportability
- Project Timeline
- ITEG Project Issues
- Future ITEG development
- Questions

ITEG DEFINITION

- **Integrated Trailer-ECU-Generator (ITEG), also known as Generator-ECU-Trailer (GET)**
- **System that combines a diesel electric generator and Environmental Control Unit (ECU) on a HMMWV-towable trailer**
- **Usually includes requirement for additional cargo capacity to carry a tent on the trailer**
- **General requirements**
  - **Mobility: 4200 lbs or less gross weight & HMMWV towable**
  - **Power available: 10 kW or more with max ECU demand**
  - **ECU: 8 tons/96,000 BTU per hour cooling and 40,000 BTU per hr heating**

ITEG DEFINITION



USMC ITEG REQUIREMENT

- **4 Universal Needs Statements (UNS) have come into MCCDC for ITEG systems**
  - **2 Urgent, 2 Conventional**
  - **Currently being validated via Combat Development Process**
- **An ITEG variant (General Dynamics GET Spiral 1) is currently part of the Combat Operations Center (COC) program.**
- **Various other commercial ITEGs have been purchased by Marine Corps units for other purposes.**

ITEG DEVELOPMENT EFFORTS

- **Efforts began in 2005**
  - **Model development and analysis**
  - **Identification of three primary courses of action**
    - **Commercial off-the-shelf (COTS) or Modified COTS item**
    - **Integration of existing USMC components**
    - **Developmental system**
- **Based on business case analysis and user community input, the integration approach was selected (77% user preference).**

ITEG DEVELOPMENT EFFORTS

User community ranking of ITEG attributes:

1. **Performance**
   - **Generator (export power availability)**
   - **ECU (cooling capacity)**
   - **Trailer (mobility)**
2. **Maintainability**
3. **Supportability**
4. **Transportability**
5. **System safety and human factors engineering**

ITEG COURSES OF ACTION

1. **Do nothing – status quo**
   - Disparate & varied equipment in the fleet
   - Throw-away systems
   - No organic support
2. **Integrate existing USMC / Army supported products into system**
   - All built for general purpose, not specific use
   - Individually optimized for HMMWV transport, not in unison
3. **Procure COTS / NDI**
   - Least up-front cost
   - Adequate market to select from
   - Fleet acceptance of products
4. **Modify COTS / NDI**
   - Could possibly garner another 5-10% improvement
   - Requires time and money
5. **Developmental System**
   - Requires lots of time and money
   - Some long range efforts are underway (USMC SBIR, Army R&D)

COA 2 - INTEGRATE EXISTING COMPONENTS

- **Integration effort attempted with:**
  - **M-1102 HC trailer (HMMWV)**
  - **B0980Generator (MAGNUM 22 kW)**
  - **B0014 ECU (96,000 BTU/hr)**
- **Failed safety assessment due to excessive weigh**
- **Will re-investigate in 2008 with new MTVR trailer (8000# payload)**

MTVR Trailer

CURRENT ITEG PROJECT

- **With no funding available for a research and development program,**

- **The only remaining Course of Action was to acquire a COTS/NDI system (COA #3)**

CURRENT ITEG PROJECT

- **Market research performed in 2006 for:**
  - **HMMWV towable**
  - **96K BTU/hr cooling**
  - **20-30 kW total electrical power**
  - **300-500 lbs additional payload capacity**
- **Competition of responding vendors with commercial systems was held in 2006**
- **Program funded by the Defense Acquisition Challenge Program (OSD)**

CURRENT ITEG PROJECT

- **GD C4S Generator-ECU-Trailer (GET) selected**
  - Loaded Weight ≤ 4200 lbs
  - HMMWV towable
  - Payload Available ~ 290 lbs
  - Generator Capacity 20 kW
  - Export approx. 5-7 kW (with full ECU load)
  - Cooling Capacity 96,000 BTU/Hr *
  - Meets Environmental Performance requirements
  - Fuel Capacity 8 hrs
  - Uses modified LTT chassis

Currently in production verification testing

ITEG SUPPORTABILITY

- **The General Dynamics (GD C4S) GET system is the Marine Corps standard for ITEG.**
- **ITEG will be organically supported**
  - **Parts support will be through the supply system**
  - **Maintainers will be trained to repair the ITEG**
- **ITEGs will be centrally controlled items**
- **Intent of this effort is to get the USMC to a single product**
  - **Programs / FMF units with other solutions will be on their own for support.**
  - **Even though we have a standard solution, the losers are still marketing their wares. "Caveat emptor" to the Fleet.**

PROJECT TIMELINE

• Proposals & Bid Samples Received	1 Jun 2006
• Aberdeen Testing (with User Evaluation)	Jun-Aug 2006
• Select/Award Single Winner	Sept 2006
• Deliver 5 systems for First Article Test	Dec 2006
• Conduct Production Verification Test	Dec 2006 to May 2007
• Production Articles available	late 2007

ITEG ISSUES

- **ITEG is not a direct replacement for any current equipment item.**
- **PM EPS will provide the mechanism (contract) for other programs to obtain ITEGs as components of their systems**
- **There is no plan to field to using units as a stand-alone capability unless validated by MCCDC**
- **We have a contract limit of 200 units for the current contract**

ISSUES

- **ITEGs are not the answer to every need**
  - **Standard generators and ECUs are more capable; many performance compromises were required to achieve HMMWV towability.**
  - **Not everything needs to be HMMWV towable.**

FUTURE DEVELOPMENT

- As long as the HMMWV is the tow vehicle, system weight is limited to ≤ 4200 lbs.
- Environmental regulations
  - Force change of refrigerants in ECU (2010)
  - Force change of generator engines (2008)
- More integrated generator/ECU
- Ability to manage and control ECU power requirements while preserving export power and the best possible level of cooling

Questions ?

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