Project Description—Explosive Ordnance Disposal (EOD) operators currently use the Man Transportable Robotic System (MTRS) platforms, MK2 (Talon) and MK1 (Packbot). The grippers on these platforms were designed to be general purpose end-effectors, grippers that can be used for anything but do not excel at any specific task. Operators are often exposed to scenarios where the grippers do not perform to their expectations forcing them to compromise. These scenarios are often unforeseeable by the engineers. As such, it would be beneficial if the operators possessed a capability to manufacture replacement parts and new grippers as needed.

**The Technology:**
- 3D Printer: Stratasys Corporation, Fortus 900mc
- Allowable Print Volume—36in X 24in X 36in
- Materials used:
  - Replica grippers and end effector bases: Ultem 9085 — Highest tensile strength Thermoplastic available.
  - Specialized Grippers and Extra parts: Nylon 12 — Highest fatigue resistance and elongation at break Thermoplastic available.

**Business Case:**
- Once designs are finalized, the 3D Models can be provided to a user with 3D printer access to manufacture the parts, in turn saving logistics, scheduling, and manufacturing costs.
- This would also eliminate the need for producing and shipping the parts in the United States.

**Challenges:**
- Robot End-effectors only have one degree of motion which limits future capabilities and design implementation.
- In trying to create a semi-conformal gripper, certain parts were not able to be replicated with the 3D Printer.
- Current 3d printers manufacture parts in a layered system which is prone to weakness in certain directions.

**Transition:**
- This AM technology could be transitioned to MTRS and Advanced Explosive Ordnance Disposal Robotic System (AEODRS) platforms.
- Future advancements in AM technology and material availability will allow the manufacturing of more complex and refined designs.