

**SENIOR LEADER IN-TRANSIT COMFORT
CONFERENCE CAPSULE (SLICC)
PROPOSAL FOR
AIR MOBILITY COMMAND**

November 15 2006

DRAFT

**AFRL/IFGD
Air Force Research Laboratory
2241 Avionics Circle
Wright-Patterson AFB OH 45433-7333**

DRAFT SLICC PROPOSAL

1. INTRODUCTION

At the request of Air Mobility Command, the Air Force Research Laboratory (AFRL), Platform Connectivity Branch (IFGD) is pleased to submit this proposal for the Senior Leader In-Transit ~~Comfort~~ Conference Capsule (SLICC) designed for special purpose travel on modified USAF cargo aircraft. It is the goal of this effort to provide the Service's senior leaders with an airborne state of the art environment in which to hold private conversations, accomplish work of a sensitive nature, conduct meetings and rest while the aircraft is en route. AFRL is very familiar with Roll-on/Roll-off applications due to our previous experience with the Silver Bullet Command and Control Module, the Air Stream Trailer and our current Steel Eagle project and is confident that we will provide an excellent senior leader capsule.

2. MANAGEMENT

The SLICC effort shall be accomplished under the Agile Eagle IDIQ Contract (Contract No FA8560-05-D-4313). A Program Manager will be chosen for this effort ~~wh~~ that will be the single point of contact authorized to make decisions on behalf of AFRL. AFRL shall designate a Senior Engineer to function as the single technical interface with the customer.

3. BASIC TECHNICAL EFFORT

AFRL has first hand experience with the transport of senior leaders and will provide a functional, safe and comfortable airborne work and rest environment within the Senior Leadership In-transit ~~Comfort~~ Conference Capsule (SLICC). SLICC will be physically and acoustically isolated within the aircraft and will be provided with an independent heating/cooling system. It will be designed to withstand, without damage or loss of function, storage in a hangar environment, transport in an open vehicle and being loaded as 463L cargo. SLICC will be certified for occupancy during take off and landing on C-17, C-5 and C-130 only. Also, SLICC ~~The capsule will be fully airworthy when operating in KC-10, C-17, C-5 and C-130 aircraft during flight, including unpressurized flight. However, SLICC will be certified for occupancy during take off and landing on C-17, C-5, and C-130 only.~~

3.1 SENIOR LEADERS CAPSULE

AFRL plans to use the Steel Eagle module for the SLICC application. Because this module is already engineered for flight on C-17 and KC-10 aircraft, there will be minimum non-recurring engineering costs associated with customizing the Steel Eagle module for the senior leaders capsule.

3.1.1 AFRL shall procure an acoustically isolated and fully air worthy module mounted on a 108" x 127" air transport pallet to house the Senior Leader In-Transit ~~Comfort~~ Conference Capsule, SLICC.

3.1.1.1 The capsule shall be compatible with existing MAF Material Handling Equipment (MHE) without requiring modification to the MHE or the development of additional pieces of MHE or modification of the host aircraft

3.1.1.2 The capsule shall be compatible with existing MAF cargo restraint systems without modification to the restraint systems

3.1.1.3 The capsule shall be certified for air transport C-17, C-130, KC-10 and C-5 aircraft using the 463L cargo system, up to and including 96 inches in height, up to and including 96 inches in height

3.1.1.4 The capsule shall be certified for air transport on KC-10 aircraft, modifying the 463L cargo system in the same manner as currently accomplished for the Silver Bullet. The 96 inch height requires this module to be center-loaded.

3.1.2 AFRL shall interface with 115 VAC 400 Hz aircraft power and provide conversion to 115 VAC 60 Hz single phase power which shall be distributed throughout SLICC.

3.1.2.1 SLICC prime power shall be compatible with existing aircraft electrical systems in terms of voltages, cycles, amperage, connectors, etc. and shall meet currently defined requirements

3.1.2.2 Converted power within the capsule shall be compatible with standard, commercial 115 VAC, 60 Hz office type "carry-carry-on" equipment.

3.1.2.3 Power outlets within the capsule shall be duplex and shall have standard commercial sockets to mate with office type "carry-carry-on" equipment

3.1.2.4 A minimum of one outlet per wall shall be available with each first class seat having access to its own separate outlet

3.1.3.5 AFRL will provide additional outlets near the couch to enable each occupant to have a duplex outlet available for their needs

3.1.3.6 AFRL will provide additional outlets on the exterior of the module

3.1.3 AFRL shall design, fabricate and install a power panel with individual circuit breakers to isolate all subsystems within the capsule from the host aircraft electrical power system

3.1.3.1 The power panel will include easy to read meters for voltage, frequency and current and will include additional breakers for future growth

3.1.3.2 An emergency power cut off switch will be provided

3.1.4 AFRL shall install an Environmental Control System (ECS) to maintain environmental temperature within the SLICC during both airborne and ground operations

3.1.4.1 The ECS shall maintain an internal capsule temperature between 65-80 deg F (within +/- 3 deg) when temperatures outside the capsule range between 32 and 120 degrees.

3.1.4.2 An ECS thermostat shall be located within easy reach of the occupants and capable of displaying both ambient capsule temperature and desired capsule temperature

3.1.5 AFRL shall design the SLICC to maintain the same pressure altitude (PA) as the interior of the host aircraft

3.1.5.1 The SLICC shall maintain full operational capability of all sub-components at PAs equal to sea level and up to and including 6,000 feet Mean Sea Level (MSL) under Standard Day conditions

3.1.5.2 The SLICC shall maintain full operational capability of all safety features and safety related sub-components at PAs equal to -1000 feet MSL up to and including the maximum host aircraft operating altitude under Standard Day conditions

Comment [gh1]: This is not part of the requirement and brings up concerns about making the outlets corrosion-proof and water-proof.

3.2 SAFETY

AFRL will design the SLICC to provide a safe environment for the senior leaders inside the capsule. Based on experience, AFRL proposes to provide additional safety equipment not required by AMC. All safety items will be mounted and installed within full airworthiness standards

3.2.1 AFRL shall provide SLICC with two easily accessible entry/exit locations on adjacent walls consisting of one full sized primary door and one secondary escape hatch.

3.2.1.1 Both the primary and secondary locations shall be capable of being secured/locked from outside and from inside the capsule without requiring the use of electrical power.

3.2.1.2 The secondary escape hatch shall be capable of being opened and fully removed from both inside and outside the capsule.

3.2.1.3 Both the primary and secondary locations shall be clearly marked and the markings shall be visible in case of loss of aircraft power

3.2.1.4 Both the door and the escape hatch shall have placards describing their operation affixed to both sides near the handles.

3.2.2 AFRL shall provide a combination visual and audio annunciator on two sides of the capsule which alarms when ever

- The capsule ECS is inoperable
- The capsule internal emergency lighting system is in operation
- The capsule occupants require emergency assistance from the flight crew

3.2.3 AFRL shall provide a combination visual and audio annunciator within the capsule which is operated by external flight crew to notify the capsule occupants of an emergency situation

3.2.4 AFRL shall provide a self contained emergency lighting system which shall maintain emergency lighting for a minimum of 20 minutes.

3.2.4.1 The emergency lighting shall be automatically energized when ever

- The capsule loses primary power
- The capsule experiences the acceleration/deceleration forces that energize the host aircraft emergency lighting system

3.2.4.2 The emergency lighting system shall have a disarming feature so that it will not turn on during storage or during extended periods when the capsule is non-powered.

3.2.5 AFRL shall install emergency equipment within the capsule to service up to four persons

3.2.5.1 A minimum of four portable breathing devices shall be stowed within the capsule accessible to each seat location

3.2.5.2 One aircraft certified fire extinguisher shall be easily accessible to occupants of the capsule

3.2.5.3 Two Mil STD-810 approved LED flashlights will be wall mounted near both exits

3.2.5.4 One Gemtor Model D56 crash axe will be located in the capsule main section

3.2.5.5 One Phillips Heart-Start (FR-2) defibrillator will be located/stored in the capsule

3.2.6 AFRL shall research, fabricate and install interfaces as necessary to connect the Capsule into the aircraft (C-17, KC-10, C-130, C-5) intercom system.

Comment [gh2]: The intent of this requirement is not to wire into the existing aircraft emergency lighting

3.3 AMENITIES

AFRL will provide and install work surfaces and seating for comfortable travel and meetings. The environment will be aesthetically pleasing and furnished to reflect the rank of the senior leaders using the capsule.

3.3.1 AFRL shall provide and install two first class airline seats which swivel, recline and are equipped with an ~~integral-integrated~~ foot rest

- 3.3.1.1** Seats shall be equipped with proper restraints, both lap belt and one cross-over shoulder strap, and be certified for use during all phases of flight operation
- 3.3.1.3** The swivel action of the two first class airline seats shall be such that the seats can be locked into a position where the longitudinal axis of the seat is parallel to the longitudinal axis of the aircraft regardless of capsule orientation
- 3.3.2** AFRL shall provide and install one couch capable of accommodating a minimum of 2 adults with seat belt and cross-over shoulder restraints suitable for enroute flight.
- 3.3.3** AFRL shall provide an adequately sized work surface for each airline seat such that each primary senior leader can place a laptop computer and two legal pads placed side by side
- 3.3.3.1** Each airline seat work surface shall be permanently installed or easily stowed and assembled by one person without the use of tools
- 3.3.3.2** One end-table shall be provided at one end of the couch. AFRL will provide an additional end-table at the other end of the couch, space permitting.
- 3.3.4** AFRL shall provide and install as a minimum one wall mounted flat panel monitor and two wall mounted stereo speakers that satisfy the following requirements. Installation of the equipment shall not compromise the acoustical isolation of the capsule.
- 3.3.4.1** Flat panel monitor shall have a diagonal measurement of 37 inches and be capable of play back using CDs, DVDs, VHS tapes.
- 3.3.4.2** Flat panel monitor shall be high-resolution, enabling connection to computers ~~using support~~ Windows OS and to support other devices
- 3.3.4.3** Stereo wall speakers will be capable of being physically adjusted to control sound
- 3.3.4.4** One DVD player shall be permanently connected to the flat panel monitor and stereo speakers
- 3.3.4.5** AFRL also proposes to include installation of the following amenities as options
- Individual patch panels for headphones near all seating which will enable one or - more occupants to utilize the playback while other occupants work
 - Very high-end noise reduction volume controlled head-sets with storage for each seated occupant
 - A permanently installed color printer
 - A single remote capable of operating all permanently installed audio/video components
- 3.3.5** AFRL shall provide locked cabinets for storage either within or on the exterior of the capsule
- 3.3.5.1** A storage closet for a minimum of four airline garment bags shall be provided
- 3.3.5.2** An additional lockable storage container meeting minimum requested size of 5 inches deep, by 10 inches wide, by 16 inches long will be provided
- 3.2.5.3** ~~Appropriate storage location for~~ gun box capable of storing four M-9 handguns with associated holsters, belts, and ammunition clips will be provided
- 3.3.6** AFRL shall provide an aesthetically pleasing interior to include wall to wall carpeting, wall treatments or coverings and ceiling treatments or coverings.
- 3.3.7** AFRL shall provide two digital wall clocks with internal battery back up power to maintain correct time
- 3.3.7.1** Batteries shall be able to be changed without removing clocks from the wall
- 3.3.7.2** Time adjustments shall be possible without removing clocks from the wall

3.3.7.3 Clocks shall have internal illumination that automatically adjusts to ambient lighting levels

3.3.8 AFRL shall provide a trash receptacle capable of being secured within the capsule but easily removed for servicing

3.3.9 AFRL shall provide a sleep area for two adults within SLICC which is separated from the remainder of the capsule by a sound deadening curtain

3.3.9.1 Sleeping berths shall be capable of being stowed when not in use.

3.3.9.2 Sleeping surfaces shall incorporate a mattress pad or equivalent with usable sleeping dimensions of at least 39 inches by 80 inches and be of a thickness that shall be able to accommodate a 95th percentile male with no more than 50% compression of the mattress pad material

3.3.9.3 Sleeping berths will incorporate a means to secure occupants

3.4 LIGHTING

AFRL plans to meet the lighting requirements of SLICC with LED panels designed for Steel Eagle. The option of incorporating a "blackout lighting" into both the main and individual lightings is available.

3.4.1 AFRL shall provide separately controlled dimmable lighting for the work and sleep areas such that sufficient illumination is provided to perform all activities for which the capsule compartment is intended

3.4.1.1 Lighting shall be controllable throughout the complete range of possible illumination levels

3.4.1.2 Each first class work area shall be illuminated by its own light

3.4.1.3 Each berth area will be equipped with a reading light

4. TESTING

AFRL shall conduct factory testing, ground testing, and flight testing of SLICC. Testing will address and demonstrate the physical, mechanical, and electrical features of the system. Radio Frequency Interference (RFI) tests will be conducted to assure there is no interference between the Communications Station and the host aircraft radios, IFF, navigation systems, flight systems, or refueling system.

5. DOCUMENTATION

AFRL shall provide overall mechanical drawings and detail cable assembly, and wiring diagrams for the Senior Leader In-transit ~~Comfort~~ Conference Capsule in hard and soft format. AFRL will generate a SLICC System Manual which includes operational procedures, high level system drawings, and copies of all commercial manuals.

6. ASSUMPTIONS

AFRL has made the following assumptions in preparing the Schedule and Cost estimates:

- AFRL will perform no aircraft modifications, i.e. mounting antennas or installing aircraft airframe cables.
- AFRL will provide input to the sustainment groups for each aircraft for the modification of the aircraft documentation. However, AFRL will not directly modify aircraft TOs, loading plans, or other such aircraft documentation.

- All aircraft power and interphone connections will be provided by AFRL as cables with connectors to the SLICC external interface panel.
- Aircraft considered for airworthiness certification packages are C-5, C-17, C-130H and C-17.
For the C-130H a HMIA antenna must be available.
- FAA requirements for SLICC occupancy during take off and landing require a different certification process and will not be pursued for the KC-10 in this effort.
- AMC will provide one of each aircraft type at WPAFB for EMC, ground and flight acceptance testing.
Should this not be the case then the following costs for personnel and for transport for the capsule must be included in the final cost estimate
 - One trip to Mc-Guire AFB for both the C-17 and KC-10 Aircraft
 - One trip to ??????? for the C-130H Aircraft
 - One trip to ???????-Dover AFB for the C-5 Aircraft

7. SCHEDULE

AFRL shall deliver the first SLICC to AMC 14 months after receipt of funds. AFRL shall deliver the second SLICC to AMC 20 months after receipt of funds. A high level schedule broken into fiscal quarters is attached, assuming receipt of AMC funds in December of 07.

SENIOR LEADER IN-TRANSIT COMFORT-CONFERENCE CAPSULE								
	1 Qtr 07	2 Qtr 07	3 Qtr 07	4 Qtr 07	1 Qtr 08	2 Qtr 08	3 Qtr 08	4 Qtr 08
Receipt of AMC Funds	X							
Contract Award (ACA - After Contract Award)		X						
Kick Off Meeting		X						
Preliminary Design Review		X						
Capsule Orders		X						
Critical Design Review		X						
Capsule 1 Delivery to AFRL - estimate				X				
Capsule 2 Delivery to AFRL - estimate						X		
SLICC 1 Delivery to AMC (14 mos ACA)						X		
SLICC 2 Delivery to AMC (20 mos ACA)								X
Documentation and Final Report								X

TABLE 1: SLICC SCHEDULE

8. PROGRAM REVIEWS AND REPORTING

AFRL shall conduct a Kick-Off Meeting two weeks after receipt of funds, funds and one Preliminary Design Review (PDR) three months after receipt of funds. The date for the Critical Design Review (CDR) will be set at PDR. The planned CDR and PDR location is WPAFB. Since AFRL will be working very closely with AMC, Technical Interchange Meetings (TIMS) will be informal and held as requested by either AFRL or AMC. TIMs may be accomplished by phone or video conference. Program Management Reviews (PMRs) will be held at the request of AMC. Following delivery and acceptance of the completed capsules, AFRL shall provide a final report on the entire effort.

9. COST

Following are the total costs of designing, building, testing, and delivering two senior leader capsules. The subcontract for the basic capsule is included in the cost of the AFRL prime contractor, SelectTech Services Corporation. Contractor and government personnel are expected to travel to Cadillac Michigan to confer with the SLICC module subcontractor. Additional travel may be required to vendor's locations and Scott AFB for meetings.

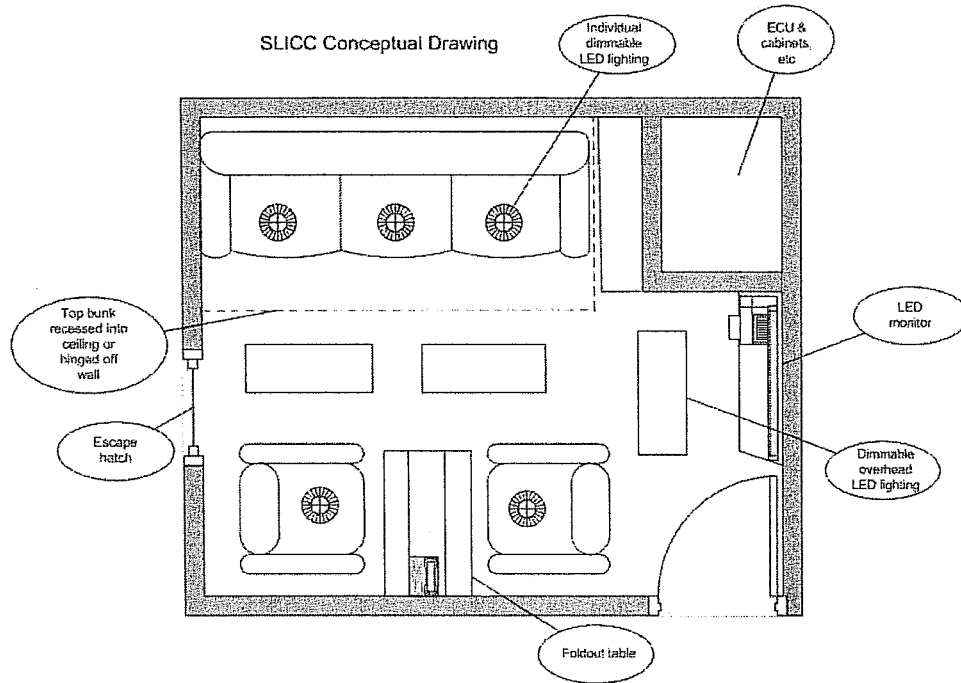
COSTS	SLICC #1	SLICC #2
Contractor Manpower	\$936,578.00	\$880,818.00
Parts/Material/Travel	\$684,052.00	\$684,052.00
Government Salary	\$50,000.00	\$50,000.00
Government Travel	\$3,500.00	\$3,000.00
Government Other	\$68,000.00	\$68,000.00

TABLE 2: COST SUMMARY

10 CONTACTS

For further information concerning this proposal or individual tasks, please contact Helen Demers at (937) 255-4947 ext 3405 or Dave Cobb at (937) 255 4949 ext 3409.

APPENDIX 1 SLICC NOTIONAL CONFIGURATION



Comment [gh3]: The location of the display screen is limited view for the couch occupants. Consider moving to location between chairs if this could be done without interfering with fold-out table. Would also provide a place to put laptops when using display screen to show briefings.

**APPENDIX 2
COMMUNICATIONS CAPABILITY ASSESSMENT**

The SLICC is primarily targeted at providing a secure and private work area for senior leaders while in-transit on MAF aircraft. The functionality of the SLICC can be greatly enhanced when a global communications capability is present. Several global communications packages are available and AFRL proposes to provision the SLICC modules with power and interconnectivity interfaces that are compatible with several of these communication packages. This effectively leverages these existing capabilities so that the SLICC can seamlessly interface and operate with these external packages to provide enhanced mission effectiveness. AFRL also proposes to provision the SLICC modules with a flexible prime power design capable of operating in several configurations, including basic configurations where the SLICC is operated without any accessory devices and other enhanced configurations where the SLICC might actually take its incoming power from an accessory package such as the Steel Eagle Command and Control Module (SE CCM).

Table 3 below shows a summary of interface compatibilities that AFRL proposes to deliver with the SLICC. This table summarizes which technical capabilities would exist on each specific aircraft.

Proposed SLICC Interface Compatibility Matrix							
Aircraft	Accessory Package	Technical Capability Access					Other Comm As Available in Aircraft (IRIDIUM, etc.)
		High-bandwidth Inmarsat SATCOM	Secure Telephone Equipment (STE) via Satellite	Secure VTC via Satellite	Secure Data (i.e. SIPRnet) via Satellite	UHF SATCOM Secure Voice/Data	
C-17 ¹ , KC-10 ¹	Silver Bullet CCM ³	Yes	Yes	Yes ³	Yes	Yes	No
C-17 ¹ , KC-10 ¹	Steel Eagle CCM ⁴	Yes	Yes	Yes	Yes	Yes	No
C-17 ¹ , KC-10 ¹ , C-130H ²	McGuire AFB Viper Terminal ⁵	Yes	Yes	Yes ⁵	No	No	No
C-17 ¹ , KC-10 ¹ , C-130H ²	US CENTAF Viper Terminal ⁶	Yes	Yes	Yes	Yes	No	No
C-5	TBD	TBD	TBD	TBD	TBD	TBD	TBD
C-17, KC-10, C-130, C-5	None Present	No	No	No	No	No	As Available/ TBD

TABLE 3: COMPATIBILITY MATRIX

Notes:

1. C-17 and KC-10 aircraft that have been modified with TECOM Inmarsat antennas are compatible with the Silver Bullet, Steel Eagle, and Viper communication packages and will provide full satellite

communications capability as shown here. Unmodified C-17 and KC-10 aircraft will not provide these enhanced SATCOM capabilities.

2. The Viper terminals shown are provisioned with hatch-mounted Inmarsat antennas and are capable of operating on C-130H aircraft. The Viper terminals currently include two terminals located at McGuire AFB, NJ and two additional Viper terminals assigned to US CENTAF.

3. There are currently two Silver Bullet Command and Control Modules in operation. These modules currently include the Honeywell MCS-7000 Inmarsat terminal, which offer two channels of high-speed (64 Kbps per channel currently upgradeable to 492 Kbps per channel in 2007) operation and up to 5 channels of low-speed (9.6 Kbps) operation. These systems could be upgraded to offer four channels of high-bandwidth SATCOM. To support secure VTC operations, the Silver Bullet modules would require some new equipment installations. The Silver Bullet systems also include two Motorola LST-5D UHF SATCOM radios for additional long-range protected communications.

4. Two Steel Eagle systems are currently being built. They are expected to be fielded in 3Q FY2007 and 4Q FY2007 and offer the Honeywell MCS-7200 Inmarsat terminal, which will provide four channels of 492 Kbps high-speed SATCOM. The Steel Eagle modules will also include two ARC-231 UHF SATCOM radios.

5. Two Viper Inmarsat terminals have been delivered to McGuire AFB by AFRL. These systems offer four channels of high-speed Inmarsat SATCOM (currently 64 Kbps per channel upgradeable to 492 Kbps per channel in 2007) for secure voice and data applications.

6. Two Viper Inmarsat terminals have been delivered to US CENTAF by AFRL. These systems offer four channels of high-speed Inmarsat SATCOM (currently 64 Kbps per channel upgradeable to 492 Kbps per channel in 2007) for secure voice and data applications.

**APPENDIX 3
PRIME POWER CONFIGURATIONS**

The SLICC systems may encounter several different configurations relative to the provisioning of prime power. Table 4 shows a summary of power configurations that the SLICC might encounter. AFRL proposes to design the SLICC with the flexible capability to operate with or without the accessory packages listed in Table 3. This flexible design means that the SLICC may accept input power (1) directly from the aircraft or (2) from a suitable accessory package in cases where the accessory package is utilizing the power outlet normally required for the SLICC. Similarly, the SLICC will be able to internally convert power to a format required for typical carry-on devices such as laptop computers and output such power to accessory packages such as the Viper terminal in cases where this is necessary.

Proposed SLICC Prime Power Capability			
Configuration	Config 1 Stand alone	Config 2 SLICC as Accessory	Config 3 SLICC as Hub
Configuration Description	Accept 115/200 VAC 400 Hz power taken directly from aircraft and convert internally to 115 VAC/60 Hz	Accept 115 VAC/60 Hz Power from Accessory Package	Accept 115/200 VAC 400 Hz from aircraft and deliver required 115/200 VAC 400 Hz and 115 VAC 60 Hz power to Accessory Package
Aircraft			
C-17	Yes	Yes (i.e. Silver Bullet, Steel Eagle)	Yes (i.e Viper package)
KC-10	Yes	Yes (i.e. Silver Bullet, Steel Eagle)	Yes (i.e Viper package)
C-5	Yes	TBD (Need definition for Accessory Packages)	TBD (Need definition of Accessory Packages)
C-130	Yes	TBD (Need definition for Accessory Packages)	Yes (i.e. Viper package)

TABLE 4: PRIME POWER MATRIX