Targets, UAVS & Range Operations
Symposium & Exhibition

Some Enabling Technologies
Brad Westphal
October 26, 2011
Agenda

• Budget impacts and macro environment
• Platforms and positions
• Technology portfolio
• Selected products and technology
• Conclusion
### Defense Outlook & Budget Impacts*

#### Defense Budget Trends

<table>
<thead>
<tr>
<th>U.S. Area of Interest</th>
<th>'12-16E CAGR</th>
<th>HON Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>O&amp;M</td>
<td>+1 to 3%</td>
<td>+++</td>
</tr>
<tr>
<td>OCO</td>
<td>-20 to -25%</td>
<td>+</td>
</tr>
<tr>
<td>Procurement</td>
<td>-4 to -6%</td>
<td>++</td>
</tr>
<tr>
<td>RDT&amp;E</td>
<td>-10 to -12%</td>
<td>+</td>
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</table>

<table>
<thead>
<tr>
<th>Int'l Area of Interest</th>
<th>'12-16E CAGR</th>
<th>HON Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>O&amp;M</td>
<td>+2 to 4%</td>
<td>+</td>
</tr>
<tr>
<td>Procurement</td>
<td>+3 to 6%</td>
<td>++</td>
</tr>
<tr>
<td>Net Total</td>
<td>Flat to +3%</td>
<td>+</td>
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#### Honeywell Defense Revenue Mix

- **DoD O&M**: 33%
- **DoD OCO**: 5%
- **DoD Procurement**: 29%
- **Other**: 23%

*Management Estimates

**Modest Exposure To Declining OCO and RDT&E Budget; International Opportunity**
Strong Defense Platform Positions

Conventional Defense & Space (Near-Peer Combatant Threats)

- Fighter/Attack/Trainer Aircraft: 30+ platforms
- Human Space: 10+ Platforms
- Surface/Soldier Vehicles: 15+ platforms
- Bomber Aircraft: 3 platforms
- DoD, Civil, and Commercial Space: 30+ Platforms
- Military Helicopters: 20+ platforms
- Mobility/Tanker Aircraft: 40+ platforms
- Army, Navy and Air Force: 60+ Platforms
- Naval Platforms: 10+ platforms

Asymmetric Threats

- Special Mission/UAV Aircraft: 20+ platforms
- International: GROWING
- International: 20+ Platforms
- Commercial-Related
- Commercial Helicopters: 20+ platforms

Services

- HTSI: Space, networks, comms, logistics, tech services
- FM&T: Specialized services & solutions

Broad & Diverse Install Base Creates Synergy Opportunities
Expansive Product and Technology Portfolio

**Crew Interface**
- Commercial Crew Interface & Displays
- Commercial Software Products
- Flight Management Systems
- Military Crew Interface
- Navigation Database & RNP Services

**Safety & Information Management**
- Cabin Mgmt System
- Comm/Nav Radios
- DataLink/Data Mgmt & Recorders
- Long Range Communication
- Ground Proximity
- Radar
- Traffic Surveillance
- Integrated Surveillance

**Navigation Systems & Sensors**
- Commercial Navigation Systems
- Defense & Space Navigation Systems
- Inertial Sensors – Accelerometers
- Inertial Sensors – Gyros
- Non-Inertial Sensors
- Magnetics & Personal Nav Systems
- Precision Landing Systems
- Radiation-Hardened Components
- Space Navigation
- Tactical Navigation Grade Systems

**Propulsion**
- AGT1500
- ALF502/LF507
- CFE738
- F124/F125
- HTF7000
- HTS900
- LTS101
- T55
- TFE731
- TPE331

**Platform Systems / High Integrity Controls**
- Integrated Avionic sSystem
- T-Hawk Micro Air Vehicle
- Real-time Information in a Tactical Environment (RITE)
- Space Systems
- Electronic Eng Controls
- Flight Controls
- Space Pointing & Stabilization

**Aero Services**
- Vibration Monitoring/HUMS
- Zing™ Remote
- Maintenance Services
- Flight Support Services

**Mechanical Sub Systems**
- Air & Thermal Systems
- Auxiliary Power Units
- Electric Power

**Mechanical Components**
- Wheels & Brakes
- Lighting

*Focused on Safety, Cost and Efficiency*
Product and Technology Development

- **Product development**
  - Has clear external customers
  - Utilizes proven technologies
  - Late stage-gate development
  - Tightly connected to market opportunities

- **Technology development**
  - Has internal or S&T customers
  - Matures technology (TRL < 6)
  - Supports early stage-gate product development
  - Tied to market need

**Distinction Between Product & Technology Development**
(Product) and Technology Field of Play

Product & Technology Horizons Support Different Needs

- New Need
- New way to Satisfy
- Win
- Upgrade
- Recapture
- Innovation
- Different

Horizon 1
- Core
Horizon 2
- Emerging
Horizon 3
- Create Options

Products/Technology

Customers/Markets

Time
(Product) and **Technology** Field of Play

<table>
<thead>
<tr>
<th>Horizon 1</th>
<th>Horizon 2</th>
<th>Horizon 3</th>
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</thead>
<tbody>
<tr>
<td>• Core technology</td>
<td>• Technology differentiation</td>
<td>• Disruptive</td>
</tr>
<tr>
<td>• Approaching maturity</td>
<td>• Patentable or licensable</td>
<td>• Discontinuous</td>
</tr>
<tr>
<td>• Mild improvements</td>
<td>• New entry</td>
<td>• Provides diversification</td>
</tr>
<tr>
<td>• Engineering to sustain</td>
<td>• Horizon 1 replacement</td>
<td>• Exclusive IP</td>
</tr>
<tr>
<td>• Mostly existing products</td>
<td>• Mostly existing products</td>
<td>• Basic/applied research</td>
</tr>
<tr>
<td>• Available</td>
<td>• ~TRL 4-7</td>
<td>• ~TRL 1-3</td>
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</tbody>
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*Product & Technology Horizons Support Different Needs*
Some Enabling **Products** and (Technologies)

**Radar Altimeters**
- 0-30,000 ft
- 28V 16W
- 59 Cu In and 3 lbs.
- RS 422 and Analog I/O

**Rate Sensors**
- 2 or 3 Axis
- 5V and .13 lbs.
- MEMS technology
- RS 422 Digital Output

**INS/GPS Systems**
- INS/GPS Deeply Integrated
- Modular and configurable
- MEMS or RLG based
- 2.4 inches (d) x 2.5 inches (h)

**Antennas**
- Low-Observable and custom
- Beam shaping

**Inertial Measurement**
- RLG or MEMS technology
- 5V and 15V
- 1.6 lbs to .35 lbs
- 33 Cu In. to 4 Cu In.
- RS422 Digital Interface

**Terrain Navigation**
- Height above ground
- 3D position
- High speed digital processing
- Doppler beam sharpened interferometric radar altimeter
- Digital map correlation

**Horizon 1 Products & Technology Are Available**
Growing Emerging Technologies

- Cold Atom Clock
- Band Gap RFOG
- Single Antenna Radar Altimeter
- MEMS and System-on-Chip
- Reaction Jet & Hybrid Controls

Growing Technologies For Evaluation and Insertion
R&D Yield Function

\[
\text{R&D Yield} = f(\text{R&D effectivity, R&D efficiency})
\]

- R&D effectivity means working on the “right” things. This implies every technology has a path to a valued product and market.
- R&D efficiency means that we are good stewards of the funds. This implies that our project management discipline is sound (including make/buy, buy/source process for efficient application of the funds)
System Challenges

• Keep pace with the evolution of threats
  – Evolution or revolution of vehicle capability

• Develop and enable new target capabilities
  – Enhance capabilities in guidance, navigation and control systems

• Manage and execute production

• Control cost of acquisition, operation and maintenance
  – Total life-cycle cost
  – Inventory and obsolescence

“Do More With Less” to Overcome Challenges – 360° Collaboration
In Conclusion

• Technology Leadership
  – Precision Navigation, Power/Propulsion, Safety Products

• System Integration Capabilities
  – Power Management Systems, Avionics, Air Systems

• Logistics & Support
  – In-Theater Support, Asset Management, Predictive Maintenance

• Global Footprint Customer Support

Focused On HON Core Themes: Efficiency & Safety

Industry Leader Committed to Innovation & Performance
Targets, UAVS & Range Operations Symposium & Exhibition

“Some Enabling Technologies”

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