Communications and 5G Impacts to Geospatial Industry

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Talking Points

• Technology on the Rise
• Impacts
• Benefits
• Response by Geospatial Profession
## Operational Satellites

### Earth Observation

<table>
<thead>
<tr>
<th>Operational Satellites by Type</th>
<th>Operational Satellites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial EO / ENVIRONMENTAL / BORDER PROTECTION / COMMUNICATIONS</td>
<td>54%</td>
</tr>
<tr>
<td>Government</td>
<td>16%</td>
</tr>
<tr>
<td>Military</td>
<td>13%</td>
</tr>
<tr>
<td>Civil</td>
<td>5%</td>
</tr>
<tr>
<td>Combination (Other) Quasi Government</td>
<td>4%</td>
</tr>
<tr>
<td>Combination (Commercial) Quasi Government</td>
<td>8%</td>
</tr>
</tbody>
</table>

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# ACTIVE EO and SATCOM

## 2019, 2021, 2022 EO/IR and SATCOM

### ACTIVE / In Service

<table>
<thead>
<tr>
<th>Year</th>
<th>EO/IR</th>
<th>SATCOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td></td>
<td>4000</td>
</tr>
<tr>
<td>2021</td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td>2022</td>
<td>500</td>
<td>4000</td>
</tr>
</tbody>
</table>

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What does this SATCOM Influx Mean?

https://www.youtube.com/watch?v=30PIO3Keras
MARKET REACTIONS & SATCOM Current Trends

Satellites 2021–
- 73% Comms
- 12% RS
- 10% R & D
- 2% Crew/Cargo
- 2% Science
- Other

Elon Musk’s “fledgling” Starlink satellite network has become a lifeline in Ukraine.
SATCOM – OneWeb vs. SpaceX vs. Telesat

2022–

• SpaceX – 31 Regions with 250K subscribers
• Telesat emphasized operating with NGSO who know GEO and ALL of them took aim at Amazon
• Amazon – stay tuned ....Kuiper Int’l GS
• One Web business model – B2C
• Telesat – B2B
• SpaceX – B2G
CHINA LEADS 5G PATENTS

Who Is Leading the 5G Patent Race?

Companies with the highest shares of global 5G technology patents*

- Huawei: 15.4%
- Samsung: 13.3%
- Nokia (incl. Alcatel-Lucent): 13.2%
- QUALCOMM: 12.9%
- LG: 8.7%
- ZTE: 5.6%
- Sharp: 4.6%
- Ericsson: 4.6%

As of February 2021
* Granted and active patent families (5G SEP patent families with at least one granted patent counted)

Source: IPlytics
CHINA LEADS OEM and Direct Distribution

Huawei’s 5G Bans Threaten to Derail China’s Belt and Road Ambitions

Official approaches to using Huawei equipment in 5G networks

- Already using or planning to use
- Unlikely to use
- Restrictions
- Ban in effect
- Not yet considering 5G or no data

Read the full Task Force report at cfr.org/BeltAndRoad

Source: CFR research.
# China Leads 5G Equipment Market

## Global market shares of network equipment providers

(Revenue share in percent, 2017)

<table>
<thead>
<tr>
<th>Company</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huawei</td>
<td>24.4</td>
</tr>
<tr>
<td>Cisco</td>
<td>18.4</td>
</tr>
<tr>
<td>Nokia</td>
<td>14.2</td>
</tr>
<tr>
<td>Ericsson</td>
<td>8.2</td>
</tr>
<tr>
<td>ZTE</td>
<td>5.5</td>
</tr>
<tr>
<td>NEC</td>
<td>3.1</td>
</tr>
<tr>
<td>Motorola</td>
<td>2.2</td>
</tr>
<tr>
<td>Others</td>
<td>24.1</td>
</tr>
</tbody>
</table>

Source: ITCandor, Statista (2019)
BENEFITS Communications and 5G

RANK THE FOLLOWING BENEFITS OF 5G IN ORDER OF WHICH ONES YOU BELIEVE WILL HAVE THE MOST POSITIVE IMPACT ON YOUR LIFE.

- Faster downloads
- Eliminate network issues in crowded areas
- Increased capacity for devices like self-driving cars
- Better work from home experience

United States
- 1: Faster downloads
- 2: Eliminate network issues in crowded areas
- 3: Increased capacity for devices like self-driving cars
- 4: Better work from home experience

Europe
- 1: Faster downloads
- 2: Eliminate network issues in crowded areas
- 3: Increased capacity for devices like self-driving cars
- 4: Better work from home experience

Japan
- 1: Faster downloads
- 2: Eliminate network issues in crowded areas
- 3: Increased capacity for devices like self-driving cars
- 4: Better work from home experience

China
- 1: Faster downloads
- 2: Eliminate network issues in crowded areas
- 3: Increased capacity for devices like self-driving cars
- 4: Better work from home experience

India
- 1: Faster downloads
- 2: Eliminate network issues in crowded areas
- 3: Increased capacity for devices like self-driving cars
- 4: Better work from home experience

Learn More About the 5G Survey
Impact of SATCOM & 5G in Battlespace Awareness

5G Implications on the Battlefield
US Military Facing New Problems of 5G
ANCHOR 5G and Network Ecosystem to Ground and no one does that better than the Geospatial Industry and Profession
Impact of Leading Market Trends on Geospatial Industry Growth

1. Enhanced workflow integration in economic sectors (AEC, Disaster, Energy, etc.)
   - High Impact (59%)
   - Medium Impact (35%)
   - Low Impact (6%)

2. New collaboration agreements outside of geospatial industry with Business Intelligence, BIM, SCADA, etc.
   - High Impact (48%)
   - Medium Impact (41%)
   - Low Impact (11%)

3. Regeneration of business ecosystem (rise of non-geospatial start-ups)
   - High Impact (20%)
   - Medium Impact (59%)
   - Low Impact (21%)

4. Evolving legislative environment
   - High Impact (28%)
   - Medium Impact (51%)
   - Low Impact (21%)

5. Evolving Standards and interoperability frameworks
   - High Impact (59%)
   - Medium Impact (33%)
   - Low Impact (28%)

Source: GeoBuiz 2022: Global Geospatial Industry Outlook; a report by GW Consulting; Geospatial World

Note: Percentages are % of respondents who ranked the given option indicating the low, medium and high impact of strategic factors on the geospatial industry growth; includes n=1500 survey responses; n*leader interviews= 500
Impact of Leading Technology on Geospatial Industry Growth

1. Artificial Intelligence (AI), Machine Learning (ML) and Deep Learning: 75%
2. Digital infrastructure (sensors and IT technology): 65%
3. Aerial mapping (Drones/UAVs): 54%
4. Ubiquitous connectivity (5G): 58%
5. Miniaturization of New Sensors (including LiDAR): 48%
6. Data Cubes (to deliver analysis-ready data): 47%
7. GE-BIM and Digital Twins: 43%
8. Quantum and Edge Computing: 43%
9. Visualization and Immersive Technology (AR/VR): 49%
10. Automation and Robotics: 44%
11. Blockchain: 17%

Source: GeoBuiz 2022: Global Geospatial Industry Outlook; a report by GW Consulting; Geospatial World

Note: Percentages are % of respondents who ranked the given option indicating the low, medium and high impact of the technology advancements on the global geospatial industry; includes n=1500 survey responses; n=leader interviews= 500

Source: GW Consulting Analysis, Survey – July 2021-Jan 2022
MARKET RESEARCH GEO
TOP FIVE MARKET DRIVERS 2022

1. Digital IaaS and reference is AWS leading the way!

2. 5G

3. BIM, SCADA

4. Digital Twins (Infrastructure) and Metaverse

5. Nationalized Space Agencies (especially in EU)
THANKS AGAIN To ASPRS EGLR and Leadership Team!

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