Leveraging Commercial Communication Satellites to support Space Environmental Monitoring

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Why Hosted Payloads…Why Commercial Partnership

USG/DoD SATCOM programs are experiencing:

- Schedule Delays
- Cost Overruns
- Budget challenges
- Looming capacity shortfalls

Use of Commercial SATCOM spacecraft and launch resources can:

- Provide Timely & Affordable access to space
- Accelerate (or maintain) schedules
- Fill gaps in operational and proof-of-concept activities

DOD and civilian space agency leadership recognize and support the notion that the commercial space industry must become an integral part of the way forward if they are to meet their objectives.

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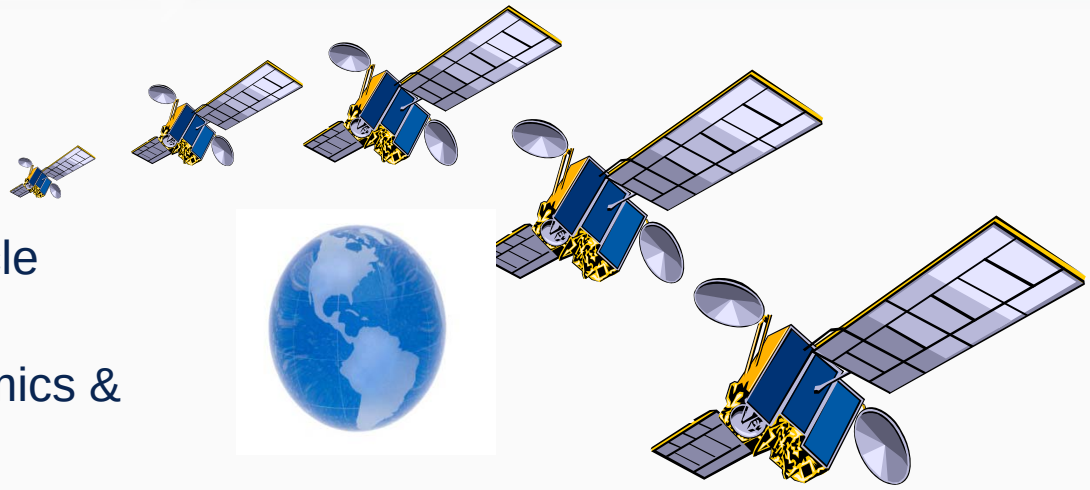
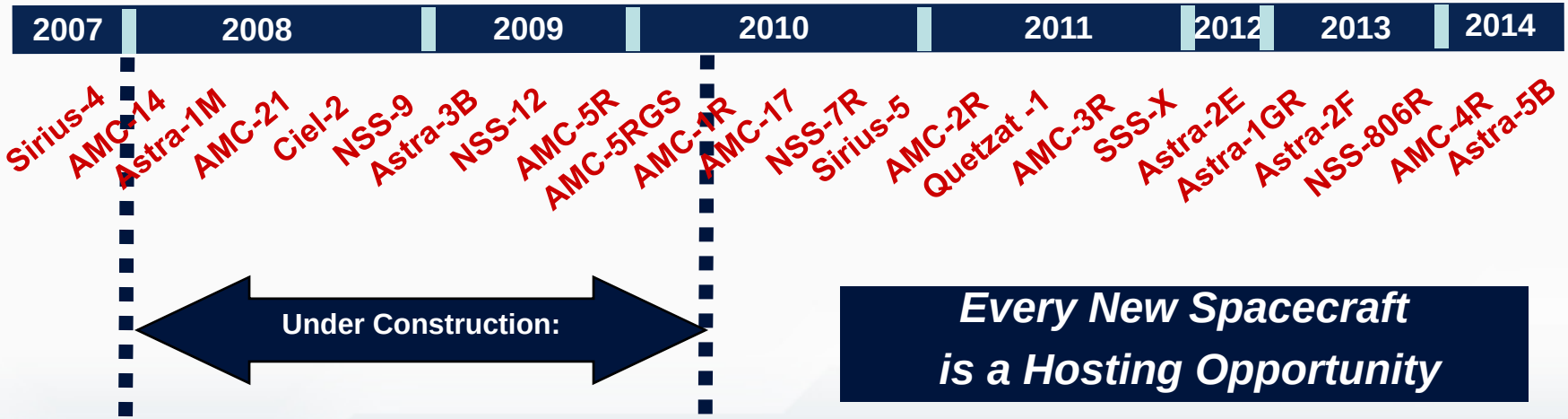
Commercial SATCOM Resources

- Average of 3 – 4 launches per year
- ~36 months concept to on station delivery
- Cost of approximately $300M USD/mission
- Dual Launch Policy (launch vehicle back-up)
- Multiple Spacecraft buys (economics & back-up planning)
- Efficient and timely acquisition process





Every New Spacecraft is a Hosting Opportunity

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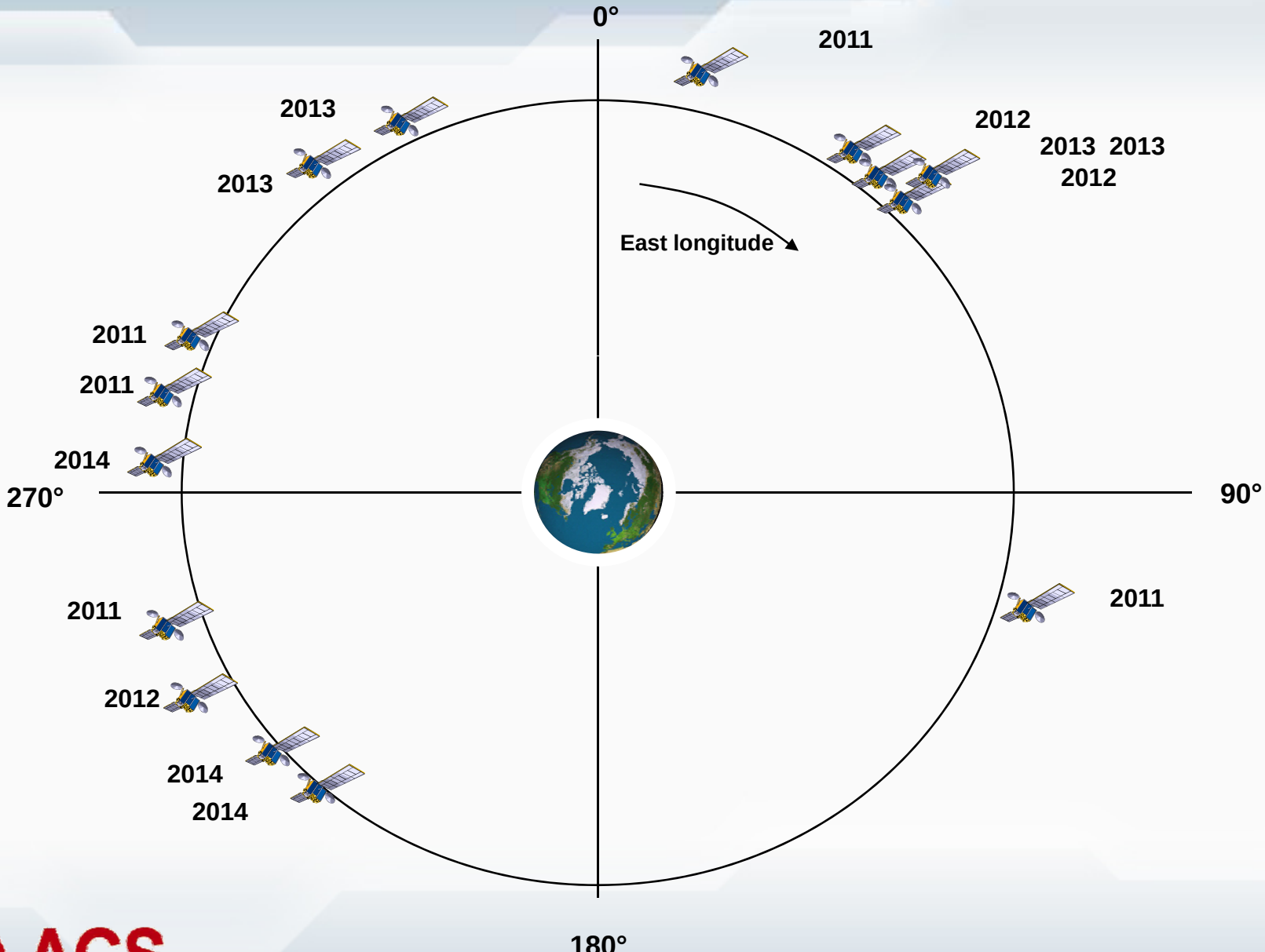
From another view



Types of Hosted Payload Missions

Driven by Commercial Mission

Rideshare

- Those with little or no impact to commercial mission
  - Primarily small sensors of various types

Integrated or Secondary Payloads

- Greater size, weight, and power (SWAP) requirement
  - May require temporary shutdown or permanent full time replacement of commercial payload
  - May force mission to "larger" spacecraft

Customized Transponders

Advantages To US Government

- Cost Savings
- Time to Launch
- Frequency of Launch

Driven by Government Mission

Reverse Hosted Payload

- USG mission is primary mission for stated period of time
- Government may "own" spacecraft during its mission life

Free Flyer or Dedicated Mission

- Paradigm/Skynet as an in service example
- Small spacecraft technologies

Advantages To US Government

- Cost Savings
- No schedule or slot dependence on commercial mission
- Relief from security concerns during mission
- US Launch potential
- Exploitation of commercial spacecraft procurement skill set (true of all but more so here)
- Economical deployment of unique capacity
- Targeted augmentation

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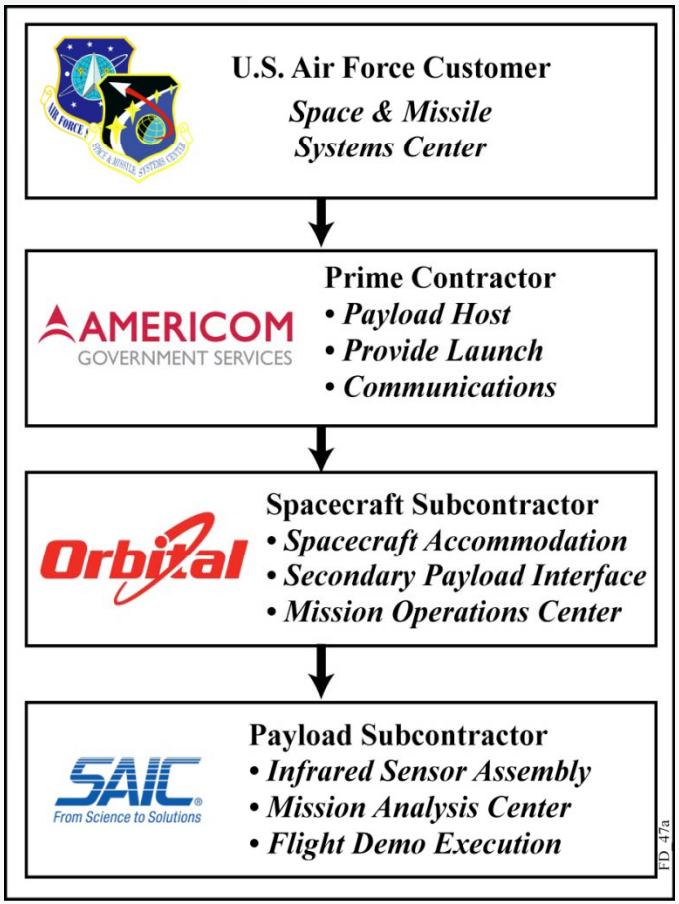
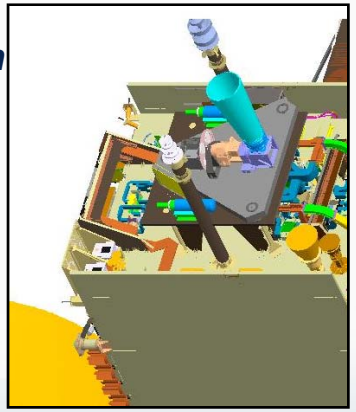
FD-CHIRP (Commercially Hosted Infrared Payload) Flight Demonstration Program



- Third Generation Infrared Program Risk Reduction
- 12 month proof of concept mission
- Sensor developed under separate contract
- Mission includes:
  - ***Integration of the ~100kg/~250w sensor onto the spacecraft***
  - ***Dev and Integration of Orbital's secondary payload interface***
  - ***Sensor operation and data delivery for 12 months***
  - ***Creation and operation of sensor operations and analysis centers***
  - ***Execution of proof of concept experimen and associated data analysis***
  - ***6 C-band transponders***
    - ***1 active for data delivery and 5 more disabled during the mission to supply required power***



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Sensor Considerations

- Size, weight (mass) and power requirements drive cost of hosted payload
  – Payloads less than 100 Kg keep costs down
- Data rate
  - Trade between on-board processing or ground processing
  - Pay for what you use
- Pointing accuracy
- Timing accuracy
- Jitter control
- Thermal balance
- View restrictions (Unobstructed field of view)
- Thruster plume

Planning Timelines

- Commercial communication satellites routinely replaced
  - 15 year lifetime
  - Maneuver fuel
  - Upgrade capability
- Planning phase for replacement is 36 to 48 months
- Potential income versus expected expenditures compared
  - Rate of Return must exceed those of other investment opportunities
  - Typical investment is approximately $250M to $350M

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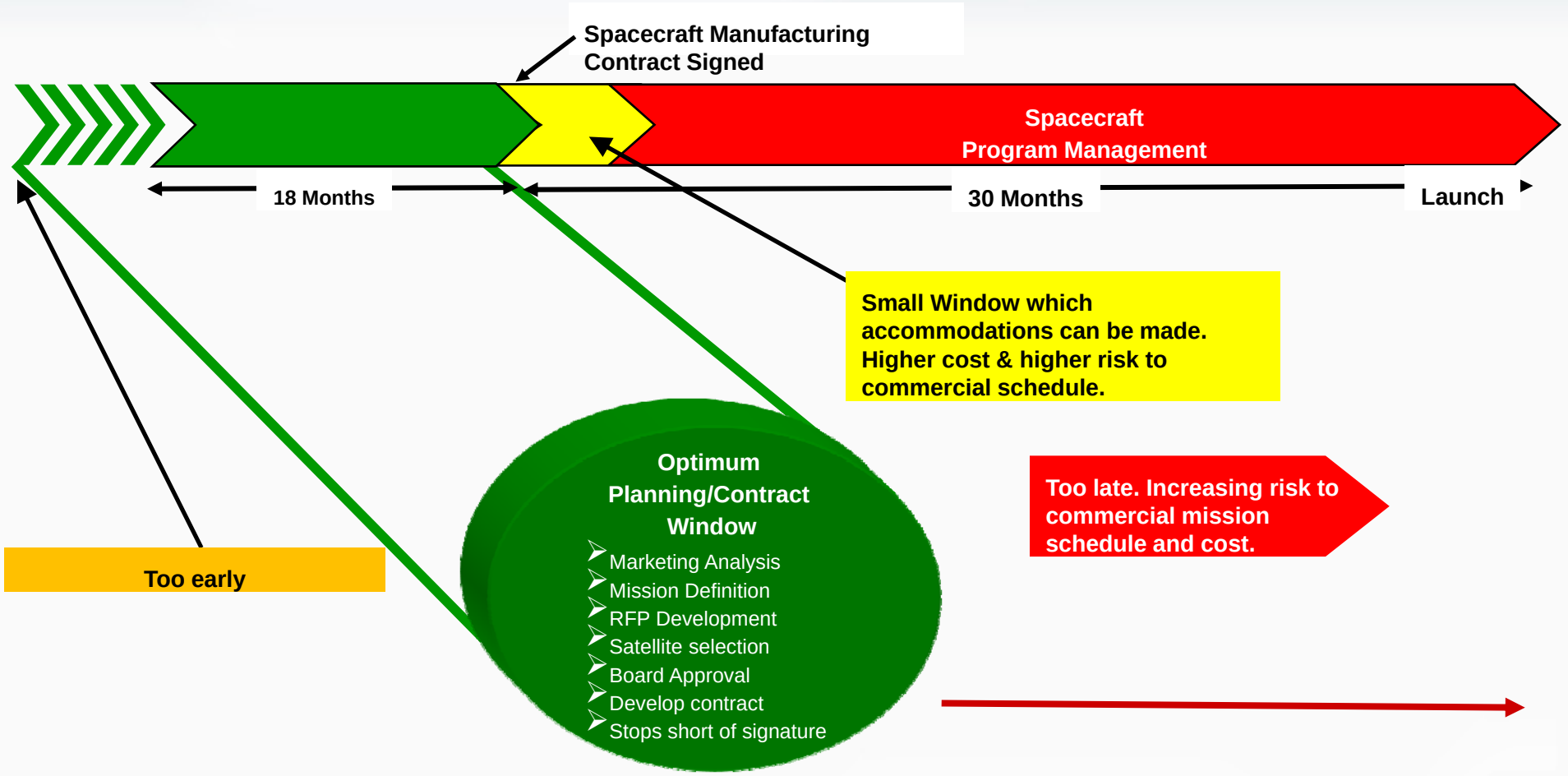
Optimum Planning and Commitment Window



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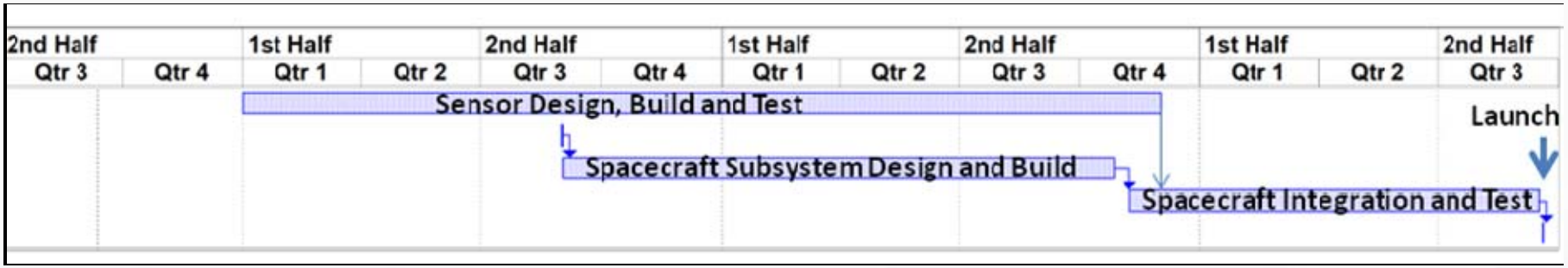
Sensor Availability

- Basic sensor specifications are required during early planning phase
- Sensor build can occur simultaneous with spacecraft subsystem design
- Completed sensor (through subsystem level tests) required approximately 12 months prior to launch



Partnering is Advantageous to All

- The commercial SATCOM industry will procure and launch spacecraft with regularity – with or without a hosted payload
- Partnership at the optimal point in time allows USG to take advantage of industries' investments
- Closer relationship allows each to understand the needs of the other
  - Once requirements are known, synergies can be identified

USG Benefits:

- ***Timely & Affordable access to space***
- Accelerated time to launch
- Frequent launch opportunities
- Flexibility to handle a wide range of missions
- Options for missions requiring multiple spacecrafts

Industry Benefits:

- Enhanced financial position on every hosted payload mission
- Sharing of launch costs
- Early transponder utilization
- Potential for multiple spacecraft service provisioning

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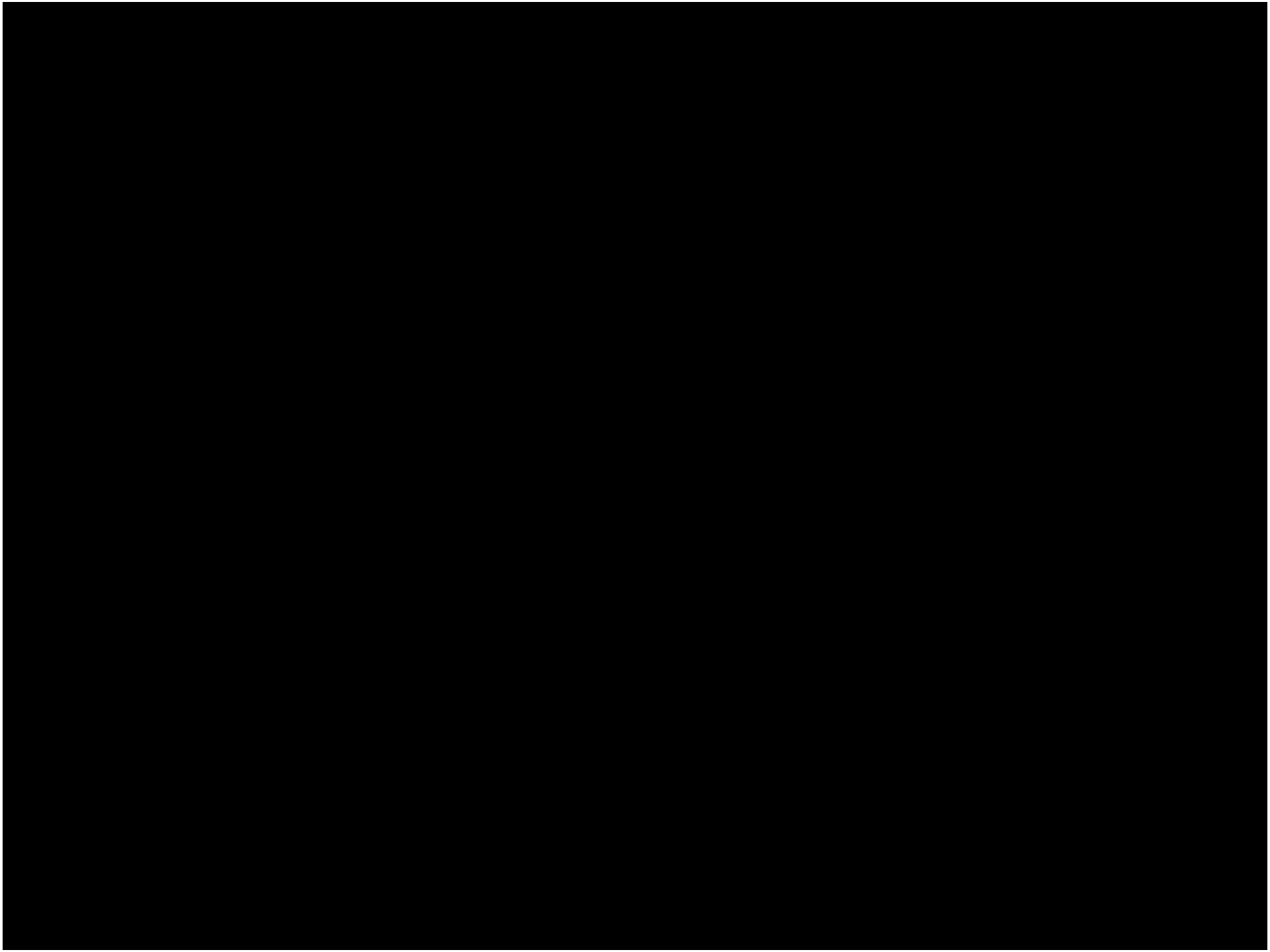
Questions



Americom Government Solutions - Corporate Overview

- AGS is part of the SES family and operates as a subsidiary of SES-Americom. Americom has been providing satellite services to US government and commercial users for over 30 years previously operating as RCA Americom and GE Americom
- In 2007 SES recorded revenues of >$2.3B with Americom accounting for ~$700M of that amount
- AGS was formally established as a U.S. company in 2001 in response to the acquisition of Americom by SES and operates under a Special Security Agreement with the United States Department of Defense
- SES Global's financial strength and stability stands out among today's leading COMSATCOM carriers
- AGS is headquartered in McLean, Virginia
- SES-Americom, headquartered in Princeton, NJ

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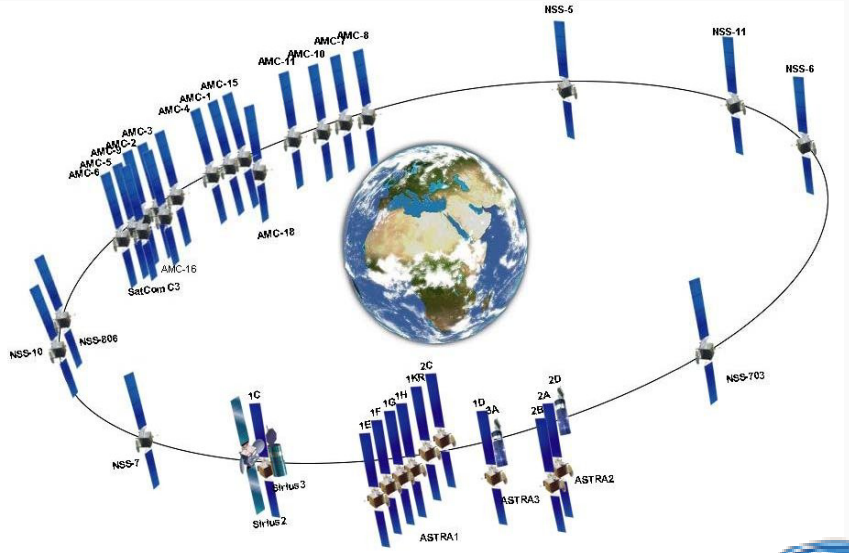
Americom Government Solutions – Corporate Overview

Global Reach - Global Fleet - Global Resources



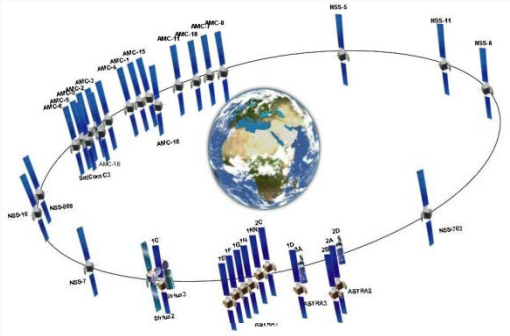
- Today's SES global satellite fleet consists of 38 satellites:
  - SES Astra , SES New Skies, SES Americom
  - Average Launch 3+ GEO Spacecraft / year
- Located at 24 orbital positions
  - Co-location on prime orbital slots
- Combination of FSS and BSS spacecraft
- SES Americom and AGS are leading providers of satellite infrastructures to a wide range of commercial and Government users

AGS Business Focus - Corporate Overview

Americom Government Services

Transponder Solutions

- Global bandwidth
- Transponder provisioning
- Full or partial transponders
- Long term, short term, occasional use
- Portability
- Multiple protection levels



Custom Network Solutions

- Customized global satellite communications solutions
- Full end-to-end network solutions
- Specific technical or service elements
- Shared or dedicated
- Architecture & needs analysis
- Platform agnostic

Government Satellite Solutions

- Strategic partnering for the development of spacecraft infrastructure
- Hosted payloads
- Full spacecraft
- Responsive to ORS needs
- Tailored RF Payloads
- Science and Technology POC.
- Sensor payloads
- Change Agent for supporting shifts in policy and procurement.