Spectrum Regulatory Issues

David G. Lubar

STIWG

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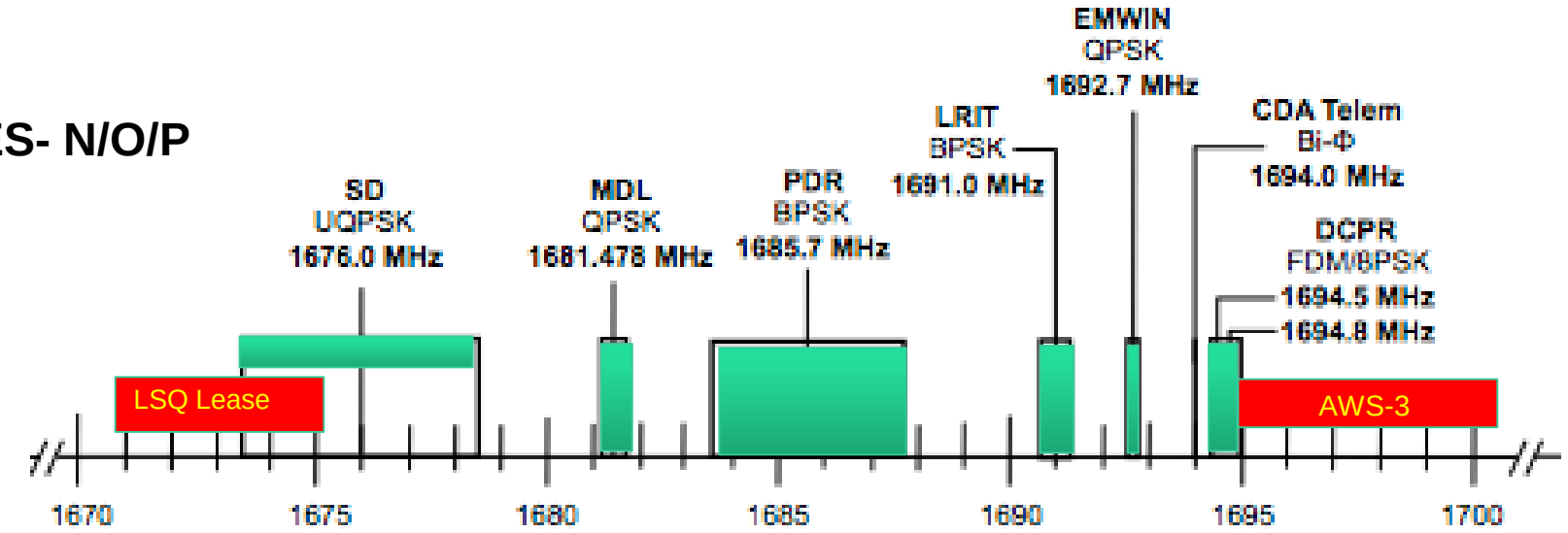
Topics

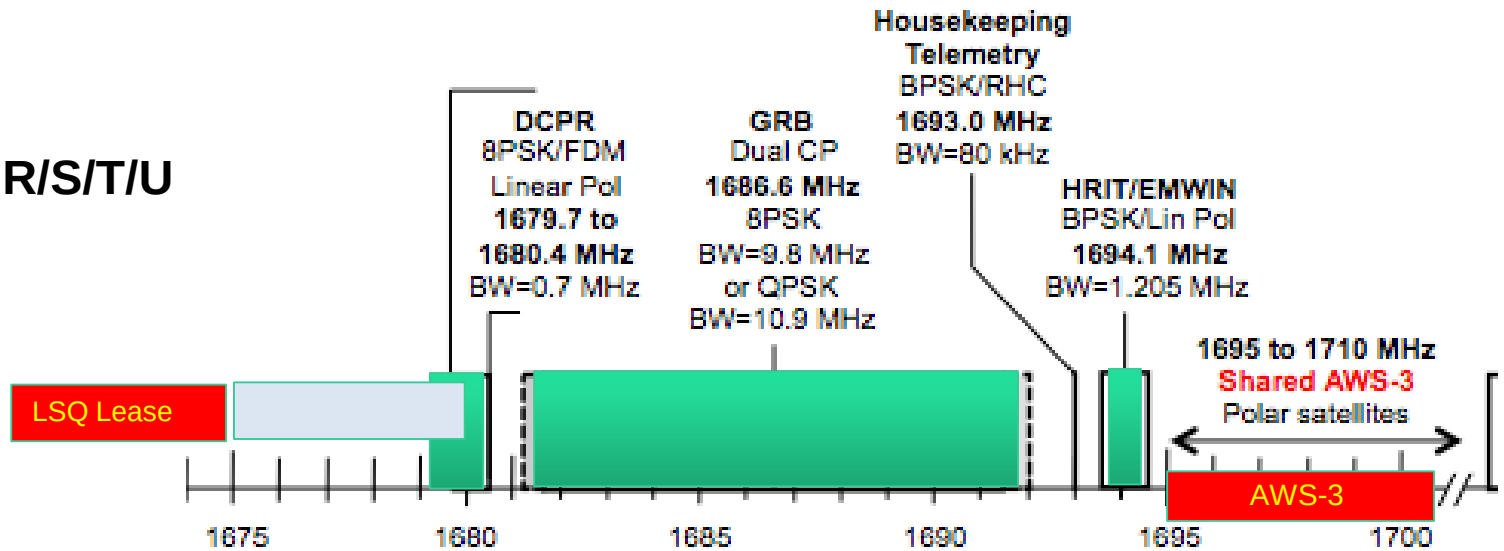
- 1675-1680 MHz Sharing Status
- NOAA Spectrum Study 1675-1680 MHz
- Licensed Terrestrial Use of 1695-1710 MHz
- International Items Associated with DCS Spectrum Bands

1675-1695 MHz Contains Significant Federal and Non-Federal Use

GOES- N/O/P



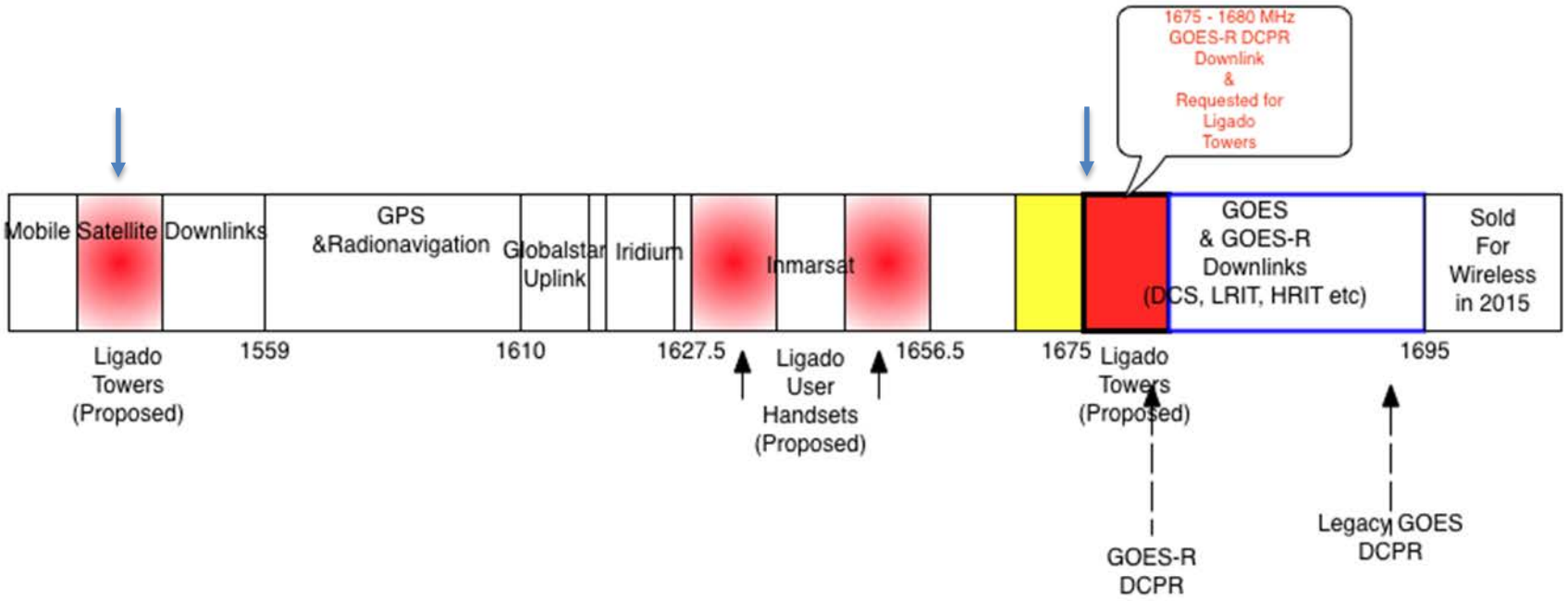
GOES- R/S/T/U



1675 – 1680 MHz Sharing

- Proposal to share 1675-1680 MHz for terrestrial towers made to FCC in 2011
- No further rulemakings or actions taken by FCC to date
- Will assume FCC will eventually do a Notice of Proposed Rulemaking (NPRM) with a Public Comment Period regarding the spectrum sharing request
  - NOAA requested funds and was granted money to conduct a 2 year study of 1675-1680 MHz sharing, which is now underway (See separate slide)
  - Potentially Affected Non-Federal Users Would Be Expected To Participate directly in the FCC's Comment Process
  - Potentially Affected Federal Users Would Make Their Views Known to the NTIA (National Telecommunications and Information Administration), who then decides if and how to comment to FCC

Commercial Proposals, Including 1675-1680 MHz



- **Solid red blocks of spectrum are desired by private entities for commercial use (i.e. transmission towers or user equipment as denoted)**
- **Proposed spectrum blocks sit on top of GOES-R DCPR data relay**
- **Proposed 1675-1680 MHz also directly adjacent to GOES-R imagery and data downlinks**
- **Commercial towers emit ~ ten million times greater power than weak downlink from gage data relayed via satellites or broadcast imagery downlink**

NOAA Spectrum Study 1675-1680 MHz

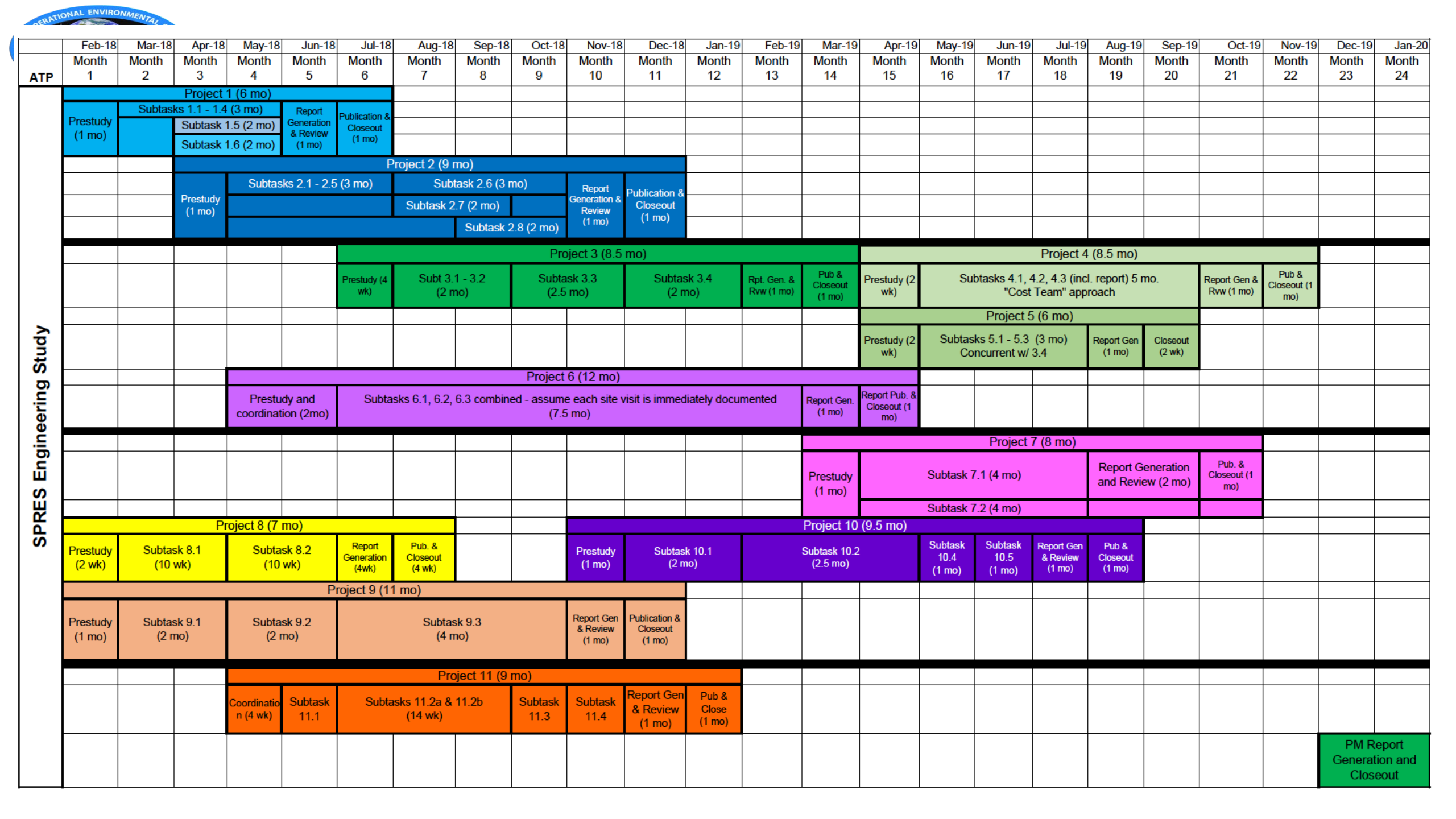
- Three Contractor Teams Selected, to be awarded Project Areas on a task-by-task basis
  - Contract: Spectrum Reallocation SP133018RP0013 on www.FedBizOpps.gov awarded Feb 13
  - NextPhase / subcontractor: Alion Science & Technology
  - Shared Spectrum Company / subcontractor: Solers, Federated Wireless, and HS Owen
  - Freedom Technologies Inc. / Subcontractor: Booz Allen Hamilton, Peraton (formerly Harris), ASRC Federal

- Near Term Tasks of Interest to the DCS Community
  - **Project 1**: Mapping the spacecraft-to-end-user data flows and user needs for Data Collection Platforms (1679-1680 MHz) and other GOES downlinks (GRB, HRIT/EMWIN)
    - Comprehensive list of Federal GOES receive sites and representative non-Federal GOES receive sites
    - Examine users in 1675-1680 MHz and in 1680-1710 MHz (Includes HRIT and LRIT)
    - What end users use the DCS data and what is the impact to end-users if the data they use if not available (if RF interference impacted GOES signal data collection)
  - **Project 2:** Analysis of potential interference to downlink sites & assessment of the impact of data loss or latency to end users

Project Tasks – 1675-1680 MHz Sharing Study

1. Mapping the spacecraft-to-end-user data flows and user needs
2. Analysis of potential interference to downlink sites & assessment of the impact of data loss or latency to end users (Estimated award March 29, 2018)
3. Identification of alternative direct-satellite-broadcast ground architectures for delivery/ distribution of GOES data to end users
4. Developing the cost of alternative data dissemination architectures as identified in #3
5. Alternative communications techniques for satellite downlinks (future GOES)
6. Detailed survey of receiving equipment (Estimated award March 29, 2018)
7. Protection studies (quantify impact from in-band and adjacent-band RFI & protection criteria / zones)
8. Anomalous propagation interference to critical GOES stations
9. Interference thresholds for Federal GOES-R satellite broadcast receivers
10. Radio frequency interference monitoring analysis for the 1675 – 1680 MHz band
11. LTE TDD Simulations, Passive Site Surveys and Active Test

From: https://www.fbo.gov/utils/view?id=590dde6a099727d6615531aefddbf9df


SPRES Engineering Study
ATP
Feb-18 Month 1
Mar-18 Month 2
Apr-18 Month 3
May-18 Month 4
Jun-18 Month 5
Jul-18 Month 6
Aug-18 Month 7
Sep-18 Month 8
Oct-18 Month 9
Nov-18 Month 10
Dec-18 Month 11
Jan-19 Month 12
Feb-19 Month 13
Mar-19 Month 14
Apr-19 Month 15
May-19 Month 16
Jun-19 Month 17
Jul-19 Month 18
Aug-19 Month 19
Sep-19 Month 20
Oct-19 Month 21
Nov-19 Month 22
Dec-19 Month 23
Jan-20 Month 24
Project 1 (6 mo)
Prestudy (1 mo)
Subtasks 1.1 - 1.4 (3 mo)
Subtask 1.5 (2 mo)
Subtask 1.6 (2 mo)
Report Generation & Review (1 mo)
Publication & Closeout (1 mo)
Project 2 (9 mo)
Prestudy (1 mo)
Subtasks 2.1 - 2.5 (3 mo)
Subtask 2.6 (3 mo)
Subtask 2.7 (2 mo)
Subtask 2.8 (2 mo)
Report Generation & Review (1 mo)
Publication & Closeout (1 mo)
Project 3 (8.5 mo)
Prestudy (4 wk)
Subt 3.1 - 3.2 (2 mo)
Subtask 3.3 (2.5 mo)
Subtask 3.4 (2 mo)
Rpt. Gen. & Rvw (1 mo)
Pub & Closeout (1 mo)
Project 4 (8.5 mo)
Prestudy (2 wk)
Subtasks 4.1, 4.2, 4.3 (incl. report) 5 mo. "Cost Team" approach
Report Gen & Rvw (1 mo)
Pub & Closeout (1 mo)
Project 5 (6 mo)
Prestudy (2 wk)
Subtasks 5.1 - 5.3 (3 mo) Concurrent w/ 3.4
Report Gen (1 mo)
Closeout (2 wk)
Project 6 (12 mo)
Prestudy and coordination (2mo)
Subtasks 6.1, 6.2, 6.3 combined - assume each site visit is immediately documented (7.5 mo)
Report Gen. (1 mo)
Report Pub. & Closeout (1 mo)
Project 7 (8 mo)
Prestudy (1 mo)
Subtask 7.1 (4 mo)
Subtask 7.2 (4 mo)
Report Generation and Review (2 mo)
Pub. & Closeout (1 mo)
Project 8 (7 mo)
Prestudy (2 wk)
Subtask 8.1 (10 wk)
Subtask 8.2 (10 wk)
Report Generation (4wk)
Pub. & Closeout (4 wk)
Project 10 (9.5 mo)
Prestudy (1 mo)
Subtask 10.1 (2 mo)
Subtask 10.2 (2.5 mo)
Subtask 10.4 (1 mo)
Subtask 10.5 (1 mo)
Report Gen & Review (1 mo)
Pub & Closeout (1 mo)
Project 9 (11 mo)
Prestudy (1 mo)
Subtask 9.1 (2 mo)
Subtask 9.2 (2 mo)
Subtask 9.3 (4 mo)
Report Gen & Review (1 mo)
Publication & Closeout (1 mo)
Project 11 (9 mo)
Coordination (4 wk)
Subtask 11.1
Subtasks 11.2a & 11.2b (14 wk)
Subtask 11.3
Subtask 11.4
Report Gen & Review (1 mo)
Pub & Close (1 mo)
PM Report Generation and Closeout

Spectrum Study and DCS

- Highly recommend that all DCS users and beneficiaries participate in any questions or discussions with the NOAA study contractors
- Project 1 is underway by contractor Next Phase / Alion Science & Technology
  - Your inputs will be essential for the contractor to achieve the project goals in the short 6 months available for Project 1 of the study

Commercial Use of 1695-1710 MHz

- In 2015, five bidders successfully won portions of the band just above the current GOES NOP DCPR for LTE handset use in 1695-1710 MHz
- Current Status: No licensees have begun to operate in this band
- Background: this handset band was paired with 1995-2020 MHz tower downlinks, primarily owned by Dish Network
  - Dish is required to begin operations in the downlink bands by March 2020 under terms of their licenses
  - It is unknown just what specific plans Dish may have, but in March 2017 they notified the FCC they planned to deploy a “next-generation 5G-capable network, focused on supporting narrowband Internet of Things”
  - This combination of frequencies was established under the LTE specification as “Band 70”
  - No known equipment is available for use with Band 70 according to phonescoop.com
- Note: Any backup operations from GOES-14, necessary to replace GOES-16 or GOES-17 would utilize the older set of frequencies. This certainly is not contemplated, but until the 2020 launch of GOES-T as a next-generation spare satellite, the sparing is provided by the older generation GOES-14 satellite.

International Regulatory: ITU

- One Agenda Item at the upcoming 2019 World Radiocommunications Conference will be of interest to the DCS community
  - The WRC is the month long effort to revise the international radio regulations, held every 3 or 4 years, and attended by the member governments.
  - Conducted by the International Telecommunications Union, an entity affiliated with the United Nations
- Agenda Item 1.2
  - “to consider in-band power limits for earth stations operating in the mobile satellite, meteorological satellite and Earth Exploration satellite services in the frequency bands 401 – 403 and 399.9-400.05 MHz bands
    - Proposes in-band power limits for telecommand ground stations under various satellite allocations to bring confidence to DCS use of this spectrum
  - Studies underway to conduct and complete necessary technical, operational and regulatory studies on the possibility of establishing in-band power requirements for earth stations uplinking in the EESS and Meteorological Satellite services