

Operations Coordination Plan Status

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Operations Coordination Plan Update

- At the last MOWG meeting (June 2017), we presented a schedule for the *Operations Coordination Plan* document update.
- Subsequently, CloudSat , CALIPSO, and to a lesser extent OCO-2 experienced anomalies.
- As a result, we decided to delay the document update until the anomalies had worked their full course.

It is now time to restart the update process

Operations Coordination Plan History

YEAR	EVENT
2002	Landsat-7 and Terra publish their <i>Morning Train Coincident Observations Implementation and Operations Plan</i>
2003	A-Train Mission Operations Working Group (MOWG) formed. Agreements begin to be developed between MOWG teams.
2005	A-Train MOWG agreements published : <ul style="list-style-type: none">• <i>Afternoon Constellation Operations Coordination Plan</i>• <i>Afternoon Constellation Contingency Procedures</i>
2008	Published Revision #1 of both documents (<i>A-Train missions only</i>)
2011	Published Revision #2 of both documents (<i>A-Train missions only</i>)
2015	Published the <i>Operations Coordination Plan For The Morning and Afternoon Constellations</i> (Document # 428-PLAN-011)

Operations Coordination Plan Change Summary

- **Constellation evolution**
 - Earth Observing -1 (EO-1) decommissioning
 - Landsat-9 plans
 - **CloudSat proposed exit**
 - Etc.
- **TanSat**
- **Envelope size change (Constellation Change Request #17)**
- **Personnel changes**
- **Constellation Coordination System (CCS) screen updates**
- **Other changes?**

Specific Document Changes Front Matter

SECTION	CHANGE
Signature page	<ul style="list-style-type: none"> Update to list the current signatories
Preface	<ul style="list-style-type: none"> Eliminate reference to pre-2015 versions.

Section 1 – Constellation Coordination

SECTION	CHANGE
1.1 (“ <i>Purpose</i> ”):	<ul style="list-style-type: none"> Bring history up-to-date (e.g., EO-1 decommissioned, TanSat launched, CloudSat’s exit, etc.)
1.3 (“ <i>Definition of Terms</i> ”)	<ul style="list-style-type: none"> Update Constellation Envelope definition.
1.4 (“ <i>Documentation</i> ”)	<ul style="list-style-type: none"> Update with the latest Applicable and Reference document versions
1.5 (“ <i>Operations Coordination</i> ”)	<ul style="list-style-type: none"> Update <i>MOWG Executive Board</i> contacts
1.6.2 (“ <i>Inter-Agency Coordination</i> ”)	<ul style="list-style-type: none"> Add process used to communicate with TanSat.
1.8 (“ <i>Anomaly and Conflict Resolution Process</i> ”)	<ul style="list-style-type: none"> Update drawing to remove EO-1

Specific Document Changes (cont'd)

Section 2 – *Afternoon Constellation*

SECTION	CHANGE
2.1 (“ <i>Afternoon Constellation Coordination</i> ”)	<ul style="list-style-type: none">• Update the science and operations leads. Add text about TanSat.
2.3.1 (“ <i>Afternoon Constellation Placement Strategy</i> ”):	<ul style="list-style-type: none">• Update the configuration drawing
2.3.3 (“ <i>Afternoon Constellation Inclination Adjust Maneuvers</i> ”)	<ul style="list-style-type: none">• Add list of inclination adjust maneuvers (IAMs) conducted since 2015
2.4.1.2 (“ <i>Constellation-Related Flags</i> ”) and 2.5 (“ <i>Afternoon Constellation Contingency Procedures</i> ”)	<ul style="list-style-type: none">• Use latest CCS screen captures

Specific Document Changes (concluded)

Section 3 – *Morning Constellation*

SECTION	CHANGE
3.1 (“ <i>Morning Constellation Coordination</i> ”)	<ul style="list-style-type: none">• Update the science and operations leads• Update the constellation drawing to delete EO-1 and possibly add Landsat-9
3.2 (“ <i>Morning Constellation Overview</i> ”)	<ul style="list-style-type: none">• Update for EO-1 decommissioning• Add Landsat-9.
3.3 (“ <i>Morning Constellation Derived and Operational Requirements</i> ”)	<ul style="list-style-type: none">• Update for EO-1 decommissioning
3.3.3 (“ <i>Morning Constellation Inclination Adjust Maneuvers</i> ”):	<ul style="list-style-type: none">• Add the dates for the Morning Constellation IAMs

Document Update Schedule (Proposed)

DATE	EVENT
February 2018	MOWG initial feedback requested
April 2018	List of changes frozen
May 2018	<i>Draft version</i> sent to MOWG teams
June 2018	Discuss at Spring 2018 MOWG meeting

Questions and suggestions?

Arigatou Gozaimasu

Merci

Thank you

Reference Section

History of the Constellation agreements (2003-2015)

(Originally presented June 2015)

Afternoon Constellation MOWG 1st Meeting (Goddard Space Flight Center, March 2003)



**MOWG was formed and began
developing agreements and guidelines.**

Operations Coordination Plan History (1 of 4)

YEAR	EVENT
2002	Landsat-7 and Terra publish their <i>Morning (AM) Train Coincident Observations Implementation and Operations Plan</i>
2003 - 2004	A-Train MOWG formed. Agreements developed between MOWG teams.
2005	A-Train MOWG published agreements: <ul style="list-style-type: none"> • <i>Afternoon Constellation Operations Coordination Plan</i> • <i>Afternoon Constellation Contingency Procedures</i>
2008	REVISION #1 published (A-Train missions only)
2010	<ul style="list-style-type: none"> • A-Train / Landsat 5 passings highlighted the need for closer coordination between the 2 constellations. • Subsequent discussions at MOWG meetings reinforced the need for <i>one</i> MOWG and one set of agreements.
2011	REVISION #2 published (still A-Train missions only)

Operations Coordination Plan History (2 of 4)

YEAR	EVENT
2012 - 2013	<ul style="list-style-type: none"> • Extensive effort spent to standardize Definitions (e.g., <i>safe exit orbit</i>, <i>Constellation Envelope</i>, etc.). • <i>Operations Coordination Plan</i> and the <i>Contingency Procedures</i> merged. Document also expanded to encompass both the Morning and Afternoon Constellations. • Drafts issued to teams in July and December 2013.
2014	<ul style="list-style-type: none"> • April 11 – Updated document presented at MOWG meeting at GSFC. • July 21 – Interim update issued to add Morning Constellation and OCO-2 information • September 19 – Interim update issued to fix some orbital configuration entries in Table 2-3, Figure 2-2, and Section 2.2. • October 31 – Final document issued for signature approval. This contained some minor updates based on feedback received at the MOWG meeting in October 2014 at NASA Langley Research Center (LaRC).

Operations Coordination Plan History (3 of 4)

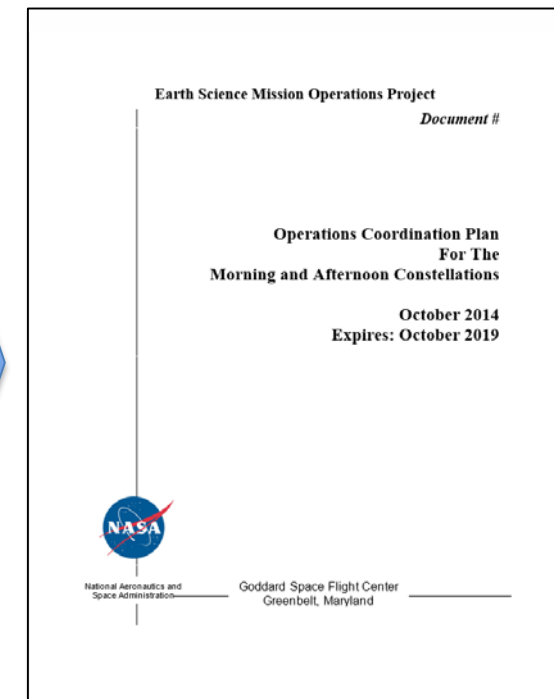
Merging documents

Morning (AM) Train Coincident Observations Implementation and Operations Plan (September 2002)

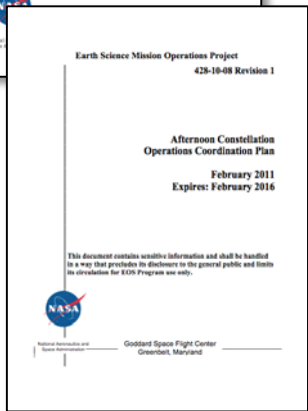
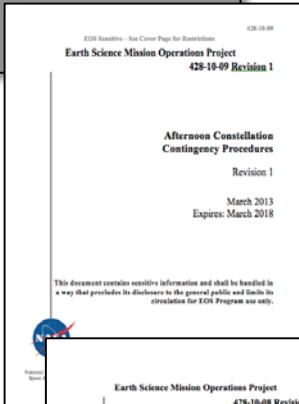
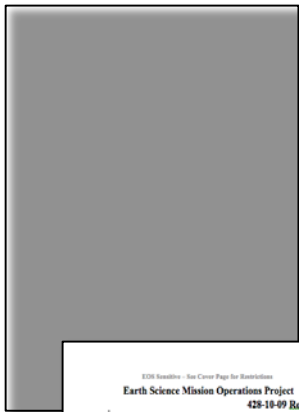
Afternoon Constellation Operations Coordination Plan (February 2011)

Afternoon Constellation Contingency Procedures (February 2011)

Merged document



“New” Operations Coordination Plan (May 2015)



Operations Coordination Plan History (4 of 4)

YEAR	EVENT
2015	<ul style="list-style-type: none">• March – Final signature received from the mission teams• March 31 – Document submitted to Earth Science Mission Operations (ESMO) Project Configuration Management process• May 13 – Document approved and distributed to all teams

Thank you!

Summary of Changes Since 2011

- **Document reorganized:**
 - Sec. 1 – *Constellation Coordination*
 - Sec. 2 – *Afternoon Constellation*
 - Sec. 3 – *Morning Constellation*
- **Sections updated** (*see next 2 slides*)

Section 1 – *Constellation Coordination*

- Section 1.1 (“*Purpose*”): Rewritten to include both constellations
- Section 1.3 (“*Definition of Terms*”): Replaced with definitions developed during spring/summer 2013 and reviewed at the MOWG meeting in September 2013.
- Section 1.4 (“*Documentation*”): Updated with the latest Applicable and Reference document versions.
- Section 1.5 (“*Operations Coordination*”): Added Conjunction Assessment Risk Analysis (CARA) and Conjunction Analysis and Evaluation Service, Alerts and Recommendations (CAESAR) references .
- Section 1.6 (“*Constellation Coordination Concepts and Guidelines*”): Added CARA to Figure 1-1.
- Section 1.8 (“*Anomaly and Conflict Resolution Process*”): Modified the conflict escalation flow to account for inter-constellation and Morning Constellation conflicts by adding Figures 1-2 and 1-4.
- Section 1.9 (“*Constellation Exit Planning*”): Added paragraphs for trigger events and for the disposition of CCS historical data.
- Section 1.11 (“*Contingency Procedures*”): This section provides the overview previously contained in the *Afternoon Constellation Contingency Procedures* document, plus 3 contingency procedures (in 1.11.2, -.3, and -.4) that affect both constellations. Note that the remaining contingency procedures are found later in the document (in Section 2).

Section 2 – *Afternoon Constellation*

- Section 2.1 (“*Afternoon Constellation Coordination*”): The science and operations leads were updated.
- Sections 2.2 – 2.3 were updated to reflect changes to the Afternoon Constellation since 2011
 - PARASOL’s exit
 - Global Change Observation Mission – Water First (GCOM-W1) launch, ascent, and entry into the A-Train
 - CloudSat’s Do-Op operations
 - Aqua/Aura’s no-yaw maneuvers
 - Orbiting Carbon Observatory-2 (OCO-2) launch, ascent, and entry into the A-Train

Section 3 – *Morning Constellation*

- All sub-sections: All new text was added with Morning Constellation information

Summary

- Updating the *Plan* required the support of all Constellation teams.
- It has been well worth the effort. The *Plan* now *reflects our collective understanding* and *documents the agreements* we use to fly safely.

***We appreciate your time and effort.
Thank you!***