

Pre-Decisional



SATOPS Enterprise Transformation

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HQ AFSPC/A5RC**

Pre-Decisional



Overview

- **The changing face of war**
- **Goals of Transformation**
- **AFSPC methodologies and opportunities**
 - **SATOPS Enterprise Transformation**
 - **50th Space Wing Integrated Operations Environment**
 - **New applications of phased array technology**
- **Final challenge of synchronization**
- **Summary**



Changing Face of War



- Ends: Preserve the American Way of Life
- Ways: For Department of Defense, the enduring principals of war
- Means: People, Processes, Infrastructure, Tools



Battleships

Shifting paradigm

Aircraft Carriers

- Today's paradigm: Information Centric Operations
- Satellite Operations must monitor, assess, plan, and execute with the best information and within event cycles



AFSPC/CC Direction



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE SPACE COMMAND

DEC 23 2008

SMC/CC HQ AFSPC DIRECTORS

1105
4020

Air Force Satellite Operations (SATOPS) Enterprise
ion

ncies and emerging threats require us to reevaluate our
our on-orbit systems. Today's stove-piped SATOPS
bits information fusion and drives operational and fiscal
ng to move expeditiously toward open/service-oriented
k systems for AFSPC satellite programs.

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requirement commonalities, enabling consolidation of functions and capabilities, reducing
duplication and improving interoperability at all levels, to include the 614th Air and Space
Operations Center. Any future AFSPC SATOPS enterprise architectures must not only address
an open architecture, but also legacy system requirements and infrastructures ensuring we
provide improved space situational awareness, defensive space control and operationally
responsive space capabilities, enabling AFSPC to meet National Security Space objectives and

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-oriented architecture; development of an integrated
concept of operations and organizational and operational
n.

vide me a progress report on this effort within 90 days. My
pell, Command Lead for Launch, Ranges and Networks,
adre.shappell@peterson.af.mil.

C. ROBERT KEHLER
General, USAF
Commander

cc:
ORS Office
AFRL/CC
ESC/CC
SIDC/CC

2. The focus of the effort is to develop more efficient SATOPS architectures and identify requirement commonalities, enabling consolidation of functions and capabilities, reducing duplication and improving interoperability at all levels, to include the 614th Air and Space Operations Center. Any future AFSPC SATOPS enterprise architectures must not only address an open architecture, but also legacy system requirements and infrastructures ensuring we provide improved space situational awareness, defensive space control and operationally responsive space capabilities, enabling AFSPC to meet National Security Space objectives and Joint warfighter operational needs.

3. In order to achieve this vision, Brig Gen John Hyten, HQ AFSPC/A5, will form a broad-based team to develop the SATOPS enterprise architecture roadmap. This team will consist of key stakeholders from your organizations. At a minimum, the roadmap will include the status of the SATOPS infrastructure (including status of current SATOPS programs); efforts to define a common operator-to-satellite service-oriented architecture; development of an integrated SATOPS roadmap and overarching concept of operations and organizational and operational requirements to implement this vision.

No more stovepipes!--Now what?



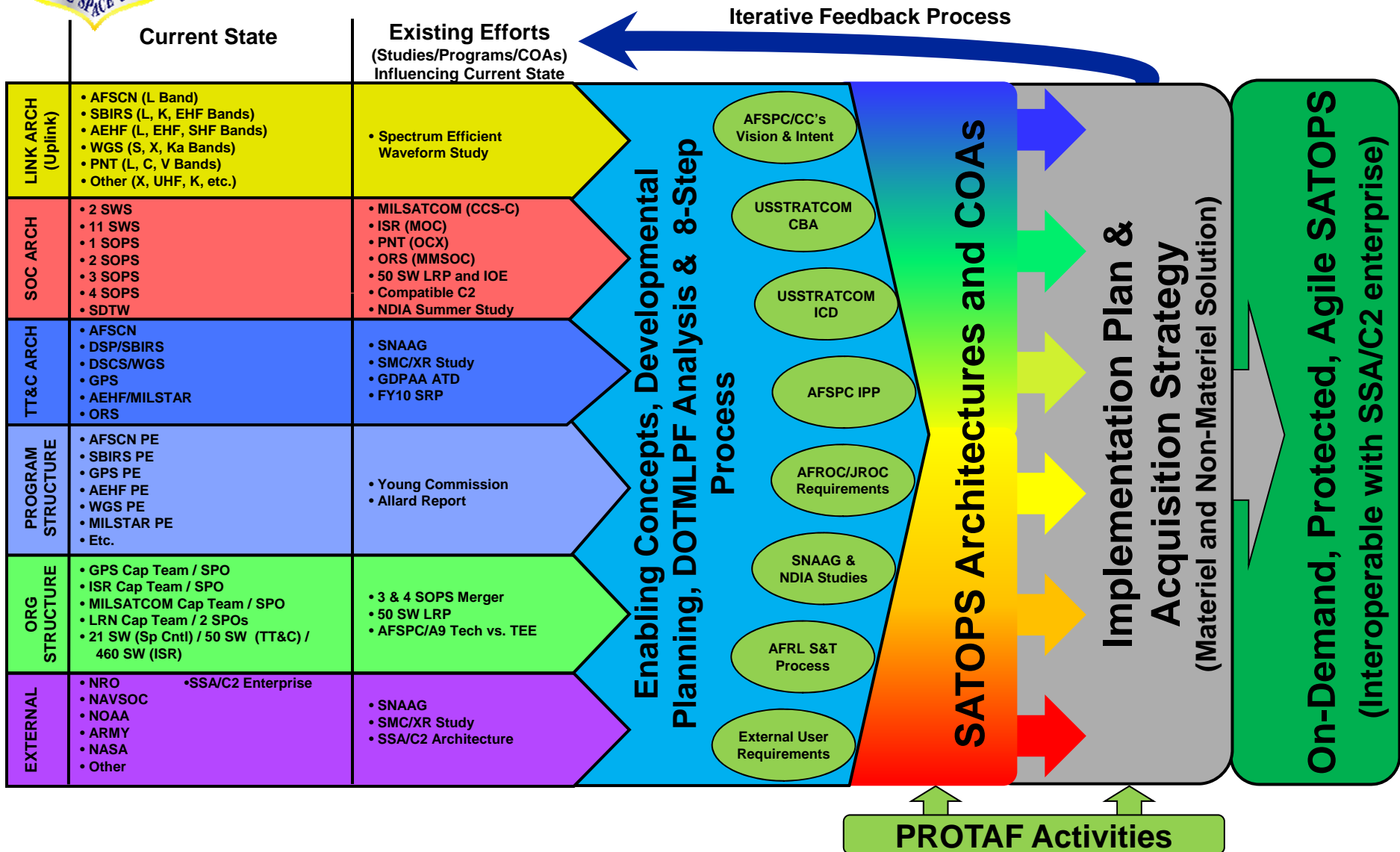
SATOPS Opportunity

- **Satellite Operations is foundational to every other space mission area**
- **Developing the right foundation makes space operations relevant to today/tomorrow's environment**
- **Managing SATOPS as an enterprise synchronized capability and creates operation efficiency**
- **Transformation goal: find the right enterprise approach to drive a best of breed set of services and develop an architecture that enables mission unique and legacy systems and capabilities**

SATOPS transformation makes ORS/SSA/Cyber integration not only possible, but PRACTICAL



SATOPS Enterprise Roadmap Approach





Senior Leader Feedback (29 May)

- **Agreement between HQ AFSPC/CC, 14 AF/CC, and SMC/CD that a resource commitment and AoA is needed to transform AFSPC SATOPS architecture**
- **Gen Kehler**
 - **“I am good with this”**
 - **“It’s not going to be a quick process”**
 - **FY14-15 timeframe is appropriate**
- **Lt Gen James**
 - **“We need to get this across the command”**
 - **“PROTAF needs to incorporate Cyber and 21 SW”**
- **Mr. Loverro**
 - **Overall vision is right on the money**
 - **Important to make sure we resource this effort and include other agencies**

Gen Kehler approved timeline and methodology presented

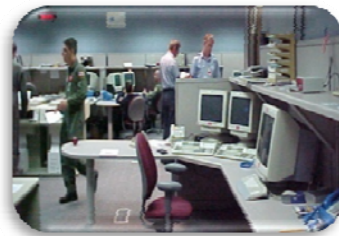


50th SW IOE Concept

1 SOPS



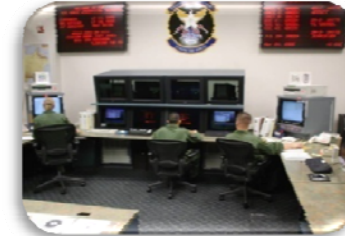
2 SOPS



3 SOPS



4 SOPS



Phase 1

- 2009-2012
- Co-location
- Consolidated Ops
- Synergy
- Efficiency



Phase 2

- 2012-2014
- Invite Joint Partners
- Saves Floor Space
- Synergy

Phase 3

- 2014 - TBD
- Interoperable Architecture

22 SOPS



HQ AFSPC/A5RC

53rd Signal Btn



NAVSOC

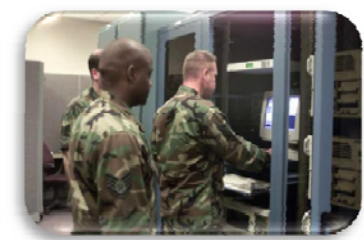


September 2009

6 SOPS



50 SCS





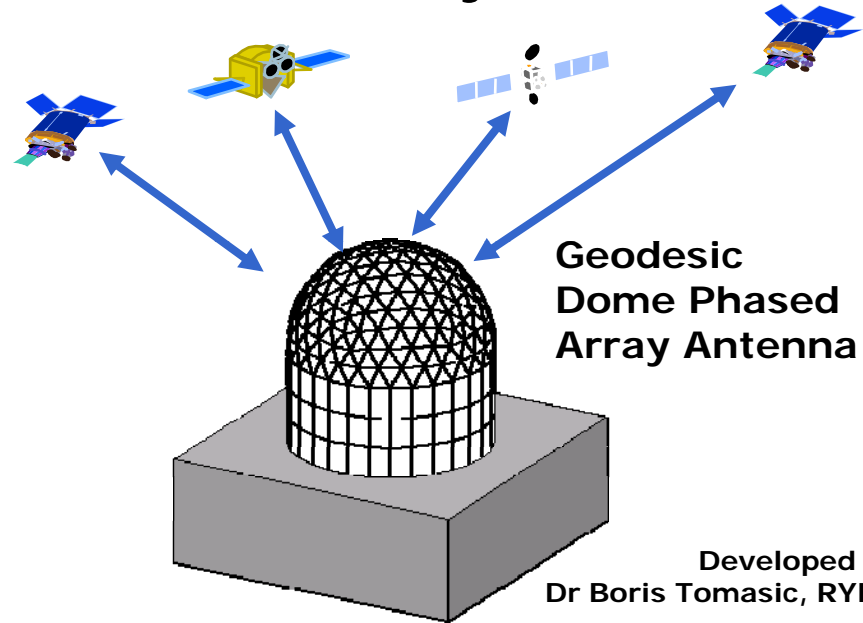
Phased Array Technology

GDPAA Concept

Reflector Dish



Phased Array Antenna



Developed by
Dr Boris Tomasic, RYHA

- 1 contact per antenna
- Mechanical scan/Keyhole effect
- Fixed beam shape
- High O&M cost
- Downtime for maintenance
- Supports traditional ops

- Up to 4 simultaneous contacts (8-beams) per antenna
- Electronic scan/No Keyhole effect
- Adaptive beam forming
- Low O&M cost
- Hot maintenance
- Enables future ops approaches



Geodesic Dome Phased Array Antenna Advanced Technology Demonstration

ATD – Mature technology to TRL 6

FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21
Concept & Arch Development					Technology Demo & Risk Reduction								Acquisition and Operations Support									

AFRL/Ryha
Technology
Development



AFRL
Testing



Critical
Experiment



ATD
AFRL & SMC funded

5
3rd Gen.
Panel/TR

ATD

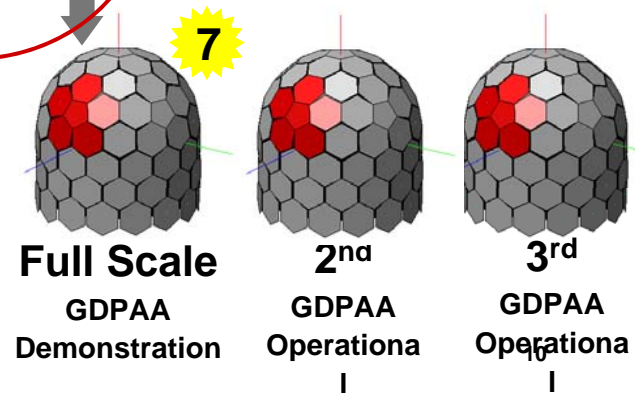
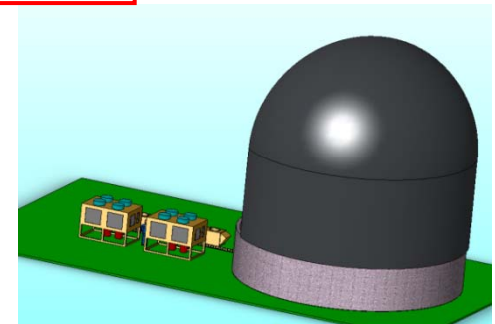
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Technology
Maturation

SMC
Technology
Freeze Date

Objective

(Notional)
SMC GDPAA
Acquisition

TRL





Final Challenge of Synchronization

- **Capture the on-going efforts**
- **Focus on a common vision**
- **Involve industry**
- **Create products that inform acquisition and operational execution**
- **Create context**

Context is essential to create an environment of success!



Summary

- The nature of warfare is, or already has, changed to information centric operations
- Transformation of SATOPS offers capability and efficiency dividends
- AFSPC is leveraging existing studies, processes, and efforts to transform SATOPS to deliver On-Demand, Protected, Agile SATOPS

Transforming SATOPS is essential to meeting the info-centric paradigm shift