
**الاجتماع الثالث والعشرون للجنة الملاحة الجوية**

الرباط ، 22- 25 مارس 2010

# مشروع نافى سات الشرق الأوسط وأفريقيا

ورقة عمل مقدمة من جمهورية مصر العربية

مقدمة

تعرض ورقة العمل الموقف الحالي لمشروع نافى سات الشرق الأوسط وأفريقيا من الدراسات التفصيلية والإجراءات التالية للمشروع.

# WORKING PAPER ON NAVISAT PROJECT

## AERONAUTICAL MOBILE SATELLITE (ROUTE) SYSTEM

## NAVISAT MIDDLE EAST & AFRICA

### Presented By EGYPT

**Summary**

- This Working Paper describes the NAVISAT project status, and its future steps that will mainly provide significant benefits for the civil aviation community in Africa and Middle East regions and the required support.

**References**

-NAVISAT Air Navigation mini Committee established during 18th ACAC Air navigation committee meeting, held in Rabat, 13-15 August, 2007 to monitor NAVISAT studies.

- NAVISAT Middle East and Africa position paper dated 11-13 October 2009
- NAVISAT Air Navigation mini Committee meeting in Cairo 7, 2009

## I. Project status:

1- Detailed studies:

| SN | studies | Start date | End date |
|---|---|---|---|
| Detailed Business and Technical studies | Phase 1-A | 11/9/2008 | 18/1/2009 |
| | Phase 1-B | 19/2/2009 | 5/10/2009 |
| | Phase 1-C | 21/10/2009 | 6/2010 |
| | Phase 1-D | 4/2010 | 11/2010 |
| | Phase 1-D' | 12/2010 | 6/2011 |
| Frequency Coordination and Regulatory & Certification studies | Phase 1 | 1/3/2009 | 8/9/2009 |
| | Phase 2 | 9/11/2009 | 8/5/2011 |
| Complementary studies | HR | 4/2010 | 7/2010 |
| | Legal | 4/2010 | 4/2011 |
| | Financial | 4/2010 | 12/2010 |

2- Financing entities for studies and other activities

- Government of Egypt
- NAVISAT Current Shareholders
- Government of France
- African Development Bank

## 3-Detailed Business and Technical studies:

- Phase 1-A Strategic Objectives & Detailed Planning
  - Duration: 1 month (*Completed – detailed below*)
  - Phase 1-A study outcomes consist of the following:
    - Gap Analysis between phase 0 and the best practice requirements
    - Strategic Goals for the NAVISAT.
    - Service Portfolio that will be offered by NAVISAT
    - Business Scenarios: to select the most applicable three scenarios from the six proposed scenarios at phase 0 study
    - Partnership Agreements / Draft MoUs between NAVISAT and the potential stakeholders.
    - SWOT Analysis
    - Detailed Plan for the NAVISAT detailed business and technical study.

- Phase 1-B : Business Plan and System Specifications
  - Duration: 5 months (the project kick off meeting was held on 19 Feb 2009
  - Phase 1-B showed that the NAVISAT project (aeronautical services and complementary services) is technically and commercially feasible.
  - During the market assessment, more than 50 entitles were visited and interviewed as follows:

| *Egypt* | *Middle East* | *Africa* | *Europe* |
|---|---|---|---|
| *9* | *14* | *21* | *5* |

Those entities were distributed in Egypt, South Africa, Senegal, Kenya, Middle East and Europe. Some of those entities were interviewed more than one time to insure the completeness and integrity of the gathered data.

- During phase 1-B and according to the most updated and refined data, a single scenario has been selected where during phase -0 six implementation scenarios were proposed then during phase 1-A, the most three suitable and applicable scenarios for the NAVISAT were selected.

- Phase 1-C Sales / Marketing /Operation / Implementation / Incorporation Plans and RFI Development
  a. KOM held on Oct 21, 2009
  b. A two stakeholders workshop were held in Cairo, one for institutional entities on DEC 7, 2009 and the other for commercial, Airlines and ANSPS, ….etc on DEC 8, 2009 to present the project progress after phase 1-B completion, to get their support and inform them about the

project next activities which includes the fund raising and RFI / RFP process.

c. Progress meeting (PM3) held in Cairo on DEC 9, 2009 focused on the current status of the project and the milestones of different activities required to complete phase 1-C.

d. A coordination meeting held in Brussels on DEC 15, 2009 between NAVISAT and the other consultants to arrange for the preparation of a 3 papers:
   - ASMG paper to be presented during ASMG meeting in Tunis during 1-6 March 2010
   - WP-4C and CPM text papers to be presented during ITU-WP-4C meeting in Bangaluru, India during 15-23 march 2010

   To support NAVISAT frequency requirements.

e. NAVISAT attended SBAS work shop in Brussels at Dec 16, 2009 which presented EGNOS project status and the results of their revisit studies.

f. NAVISAT attended AACO CEO's meeting in Bahrain on DEC 21, 2009 and NAVISAT presented the project status and its benefits, the attendances promised to support the project for the benefits of the Airlines.

g. A meeting was held in London with Inmarsat on Feb 19, 2009 to coordinate for the interoperability for Aeronautical Safety communications, a second meeting is planned to be held in March.

h. An ongoing coordination with SITA to hold a meeting with them at SITA HQ in London during March 2010 for interface definition with ANSP's.

i. QR3 meeting held during 22-24 FEB 2009 to present the following deliverables:
   (1) Marketing and Sales plan.
   (2) Organization structure and manpower plan.
   (3) Corporate Governance model.
   (4) Draft version of CONSOP.
   (5) CONSOP abstract for RFI.
   (6) Technical deliverables (Services Technical Specification – Service Technical Specifications App. B - Space System Specifications – Ground System Specification – NAVISAT baseline SLA Report).
   (7) Request for Information (RFI)
   - On 25/2/2010 a letter of intent had been sent to the following short list potential bidders:

| Potential Bidder | Nationality |
|---|---|
| EADS/Astrium | Europe |
| Mitsubishi Electric Corporation | Japan |
| Orbital Science Corporation | USA |
| Lockheed Martin Commercial Space Systems | USA |
| China Great Wall Industry Corporation | China |
| Loral Space System | USA |
| Thales Alenia Space | French/Italy |
| Boeing Space & Intelligence Systems | USA |

- All bidders received the letter of intention and accept to participate in the RFI process which will be sent at the last week of march 2010.
- It is expected to receive the RFI response by end of first week of May 2010 and after that RFI assessment of the received responses which planned to be finalized by end of May 2010, the outcomes will be used to update the selected business case and the RFP.

(8) Market Capitalization plan in process and with the integration of the financial advisor effort it will be finalized by the end of this phase.
It will contain the detailed process for the development of an adequate methodology to structure the shareholder basis and raise capital, prepare road-show material, implement the road-show process, lock-in commitments from prospective shareholders / financing agencies and Review and update financial model based on feedback and discussions with shareholders / financing agencies.

j. During QR3 meeting a three coordination meeting have been held with the HR, Legal and financial advisors to be familiarized with the project and its current status and the required schedule of their work and identifying for each advisor which deliverable will be delivered to them to start their work.

k. On 5,6 March 2010 NAVISAT attended the European Union and African Union Commissions Joint Expert Group 8 (JEG8) meeting in Cairo and presented the project to them and all the attendees accepted the project as a regional project and requested NAVISAT to submit their project to AUC formally to be adopted as one of JEG8 projects to get EU-AU support.

## II. Phase 1 frequency coordination, Regulatory and certification studies

a) On 1/3/2009 the contract signed

b) On 30/6/2009 the new NAVISAT API files (16) had been published through ITU.

c) Phase 1 outcomes are:

- Initial Due Diligence
- Generate ITU filing
- Establishment of a NAVISAT Frequency Coordination, Regulatory and Certification Entity
- Recommendations for NAVISAT certification roadmap including elements of Estimated Cost of certification
- Certification Activities

## III.Phase 2 frequency coordination, Regulatory and certification studies

a) Phase 2 KOM 9-10 November 2009 for duration of 18 months

b) A meeting was held in Cairo on Feb 4, 2010 with Thales Alenia Space VP for the coordination on the required frequencies.

c) A progress meeting held during the period 16-17 Feb 2010, during this meeting there are four subjects have been discussed:

-The current status of the frequency coordination

-The road map to secure the required frequency for the project

-The way forward in the frequency matters

-The final review of the following working papers which coordinated with NTRA:

- Arab Spectrum management group (ASMG) paper to be presented in the AMSG meeting in Tunis during the period 1-6 March 2010 as an Egyptian paper to get ASMG support on the ITU Conference Preparatory Meeting (CPM) text changes.
- Two papers to be presented during the ITU-R-WP-4C meeting in Bangaluru during the period 15-23 MARCH 2010:
  - 4C paper to provide them with NAVISAT calculation for L-band requirements
  - CPM text to provide Egyptian opinion about the Aeronautical Safety communication priority in the L-band spectrum to other services.

- The three papers have been finalized and forward to NTRA to be presented in both meetings

d) NTRA Attended ASMG meeting in Tunis during the period 1-6 march 2010.
e) NAVISAT, NTRA and Frequency coordination consultant attended ITU-R-WP-C meeting in Bangaluru / India during the period 15-23 March 2010.
f) NAVISAT received ITU invoice for the reserved new NAVISAT slots (Rfc) in with a value of 123,100 Swiss Franks
g) Certification plan (Attachment A)

**IV.Complementary studies** (HR, Legal, Financial)

1. On DEC 6, 2009 NAVISAT received the proposals of different advisor
2. On DEC 28, 2009 the technical evaluation of the received proposals completed and three advisors for each study have been selected and the results have been sent to the AfDB for no objection.
3. On JAN 18, 2010 NAVISAT received AfDB acceptance.
4. On JAN 21, 2010 the financial proposals completed and determined the winners.
5. The contracts negotiation with the winner advisor (HR-Legal-Financial) completed and the contracts have been signed initially.
6. The final report of the tenders evaluation and the results of contract negotiation have been sent to AfDB for no objection on 25 Feb 2010.
7. The three Advisors signed NDA with NAVISAT.
8. On 16 March 2010 NAVISAY received no objection from the AfDB, the contracts will be signed and the KOM dates will be determined ASAP.

V. Updated NAVISAT master plan (attachment B)

VI. NAVISAT Benefits ( Attachment C)

**VII. SUMMERY**

The main tasks of the project during the coming phase of the project are:

1. Get the RFI outputs and its assessment
2. Establish RFP and forward it to the potential bidders
3. Finalize the FUND raising and road show material to get new shareholders in the company as well as Financing agencies
4. To continue the effort to secure the required frequencies of the project

**VIII. Actions by the meeting:**

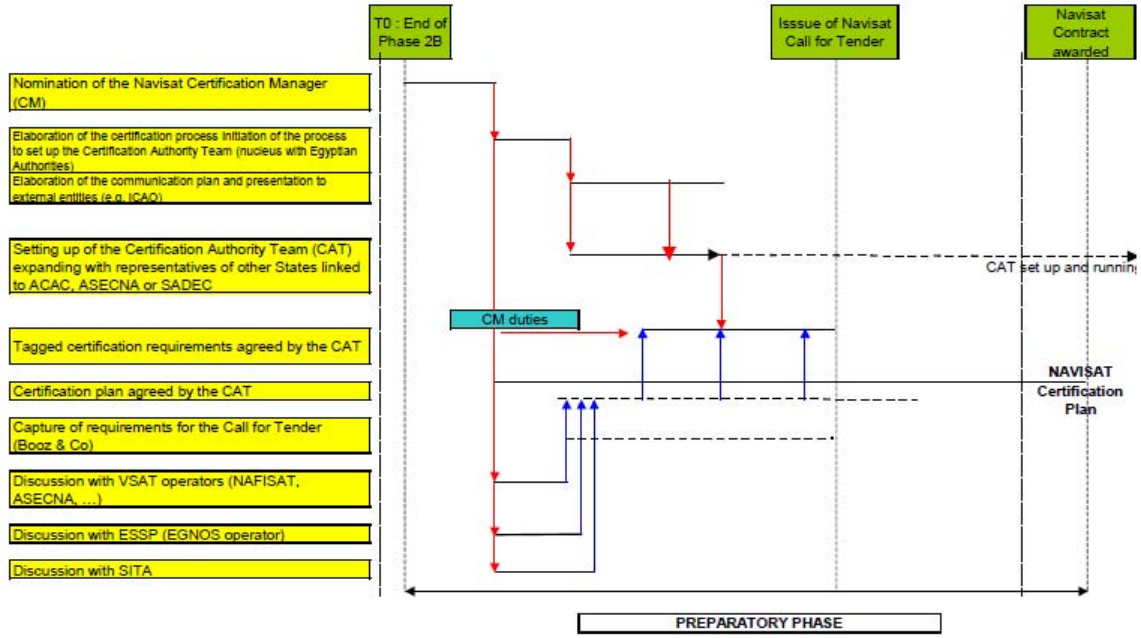
1- ACAC and ACAC member states are invited to work together to get the needed political support for NAVISAT as a vital regional infrastructure project (ICAO, European Commission, African union. Regional development fund agency, IATA , ….etc).

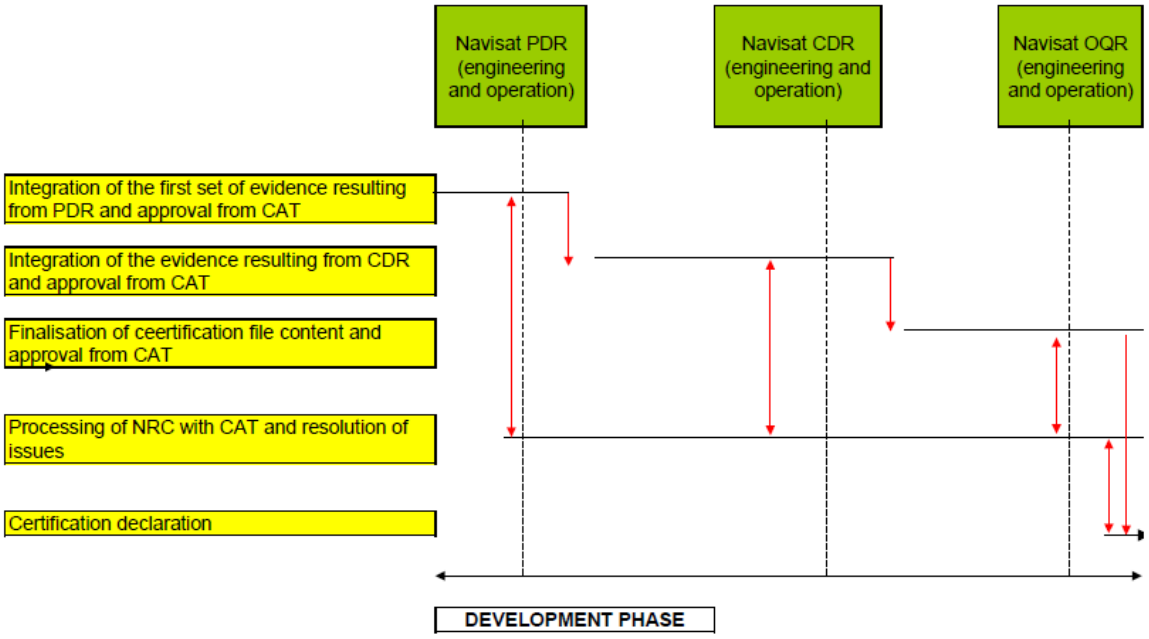
2- ACAC member states are invited to support NAVISAT frequency coordination requirements through their national telecommunication authorities in ITU meetings

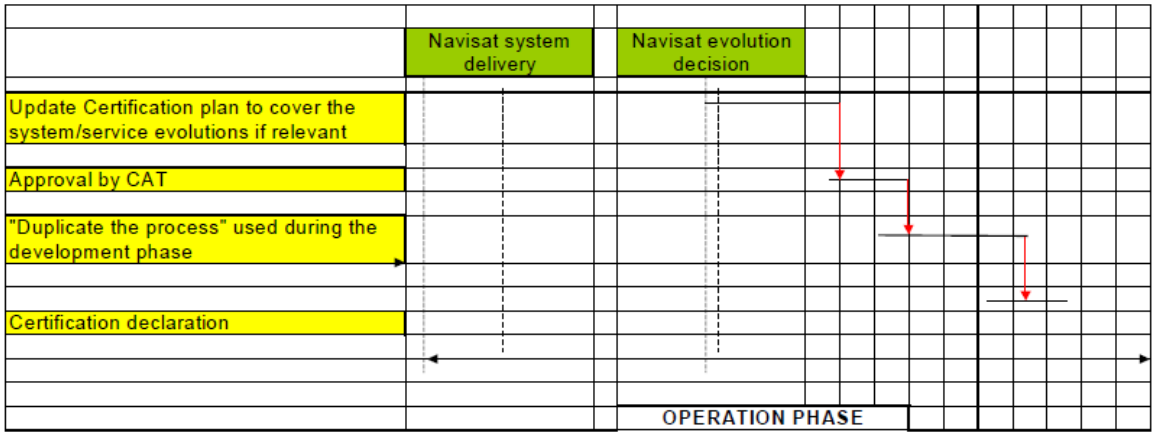
**3-** ACAC member states are invited to participate and monitor the regulatory, certification process and to establish a committee to participate in the certification process.

**4-**SBAS entities need to be established in the region.

**Attachment A**

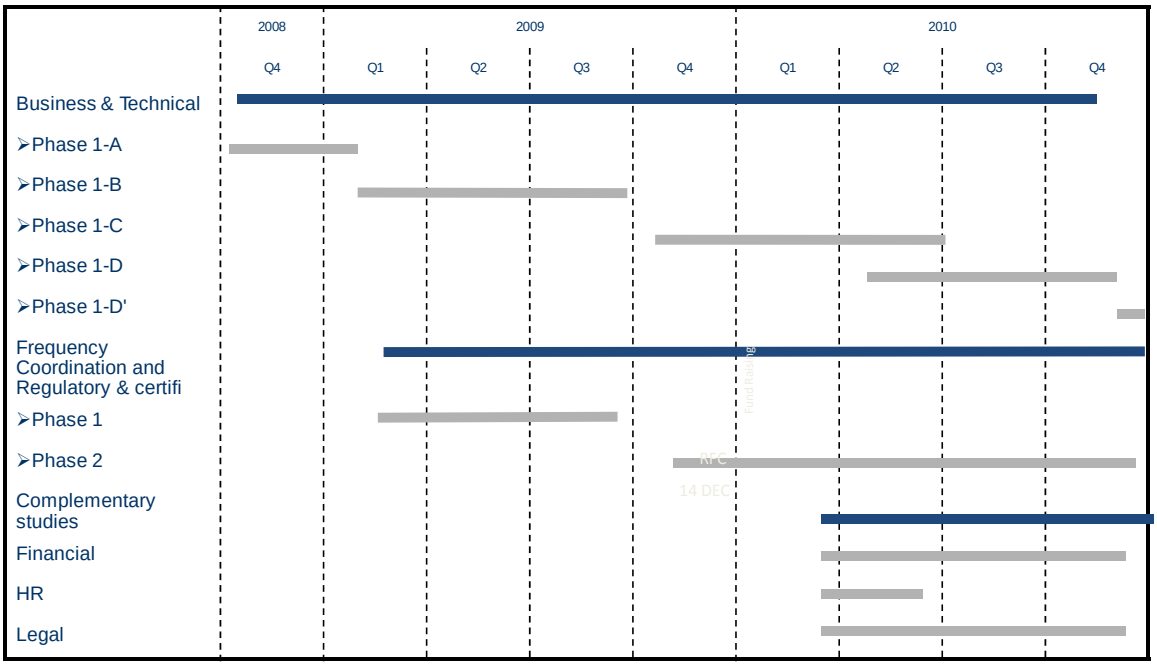

T0 : End of Phase 2B
Isssue of Navisat Call for Tender
Navisat Contract awarded
Nomination of the Navisat Certification Manager (CM)
Elaboration of the certification process Initiation of the process to set up the Certification Authority Team (nucleus with Egyptian Authorities)
Elaboration of the communication plan and presentation to external entities (e.g. ICAO)
Setting up of the Certification Authority Team (CAT) expanding with representatives of other States linked to ACAC, ASECNA or SADEC
CAT set up and runnin
CM duties
Tagged certification requirements agreed by the CAT
Certification plan agreed by the CAT
NAVISAT Certification Plan
Capture of requirements for the Call for Tender (Booz & Co)
Discussion with VSAT operators (NAFISAT, ASECNA, ...)
Discussion with ESSP (EGNOS operator)
Discussion with SITA
PREPARATORY PHASE


Navisat PDR (engineering and operation)
Navisat CDR (engineering and operation)
Navisat OQR (engineering and operation)
Integration of the first set of evidence resulting from PDR and approval from CAT
Integration of the evidence resulting from CDR and approval from CAT
Finalisation of ceertification file content and approval from CAT
Processing of NRC with CAT and resolution of issues
Certification declaration
DEVELOPMENT PHASE


Navisat system delivery
Navisat evolution decision
Update Certification plan to cover the system/service evolutions if relevant
Approval by CAT
"Duplicate the process" used during the development phase
Certification declaration
OPERATION PHASE

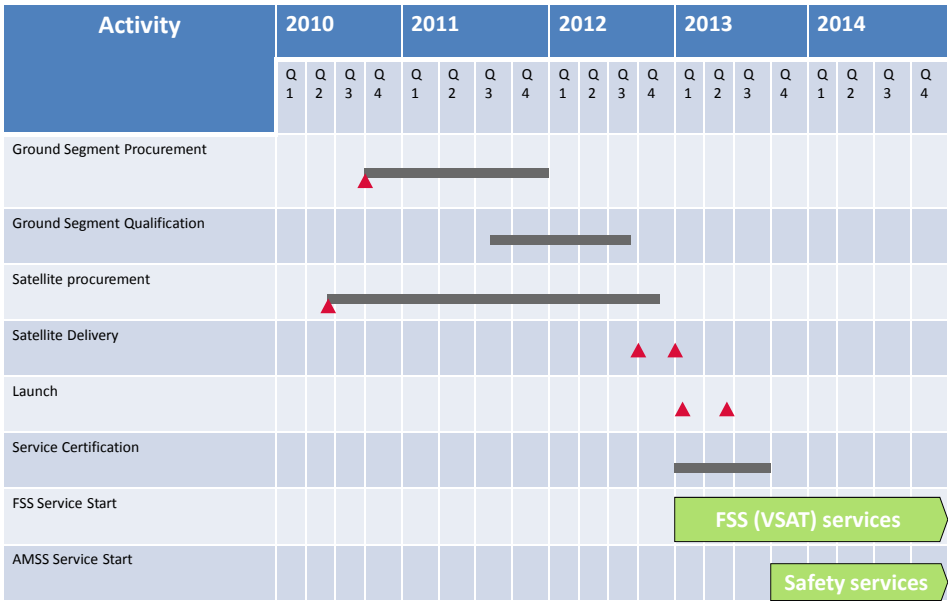
## Attachment B

# NAVISAT Detailed studies



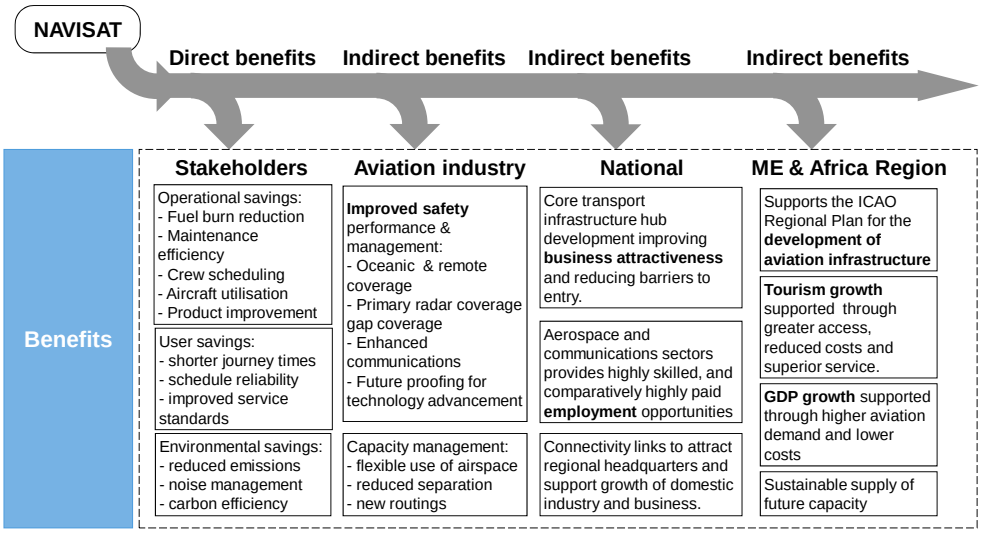

1

# Manufacture & Launch



# Attachment C

## Core to the NAVISAT concept is the provision of critical aviation infrastructure benefits, well beyond simple financial performance




## NAVISAT AMSS services will bring benefits for ATM communication to aircrafts

| | |
|---|---|
| Dedicated reliable AMSS communciations | ▪ Availability > 99.99% for aeronautical mobile satellite communications<br>▪ Dedicated, reliable communications for the aviation community (ANSP, Airlines, CAAs, Airports)<br>▪ Dependable customer service, with guaranteed response times |
| Uniform global coverage | ▪ The crash of AF 447 off the coast of Brazil on June 1st 2009 has created a greater interest in the down-linking of real time data from flights traversing oceans and remote regions<br>▪ More diversity in low and medium band Passenger Communications, AOC and AAC offerings.<br>▪ Geographical continuity of coverage across MID-AFI FIRs and beyond (with MTSAT, Inmarsat) |
| Cost Effective communications | ▪ More cost effective AOC and APC Satcom to airlines<br>▪ Opportunity to maintain more frequent AOC and AAC reports along all routes within MID-AFI, contributing to safety and search & rescue<br>▪ Alternative charging mechanism enabling higher utilization |
| Guaranted performance | ▪ Dependable customer service, with guaranteed response times<br>▪ Guaranteed reconnect time: constant and reliable support for reduced separation minimum 30/30<br>▪ Certified performance levels enabling safety communications and PBN |
| Supports CNS Capabilities | ▪ Enabler of ADS-C, ATN, CPDLC<br>▪ Support for new services (e.g. concept of e-black box - transmission of black box related data) |

Promotes economic & traffic growth in MID-AFI because of improved access

C N S

## NAVISAT Fixed Satellite Services for Aviation will enable CNS ATM improvements over remote, distant areas

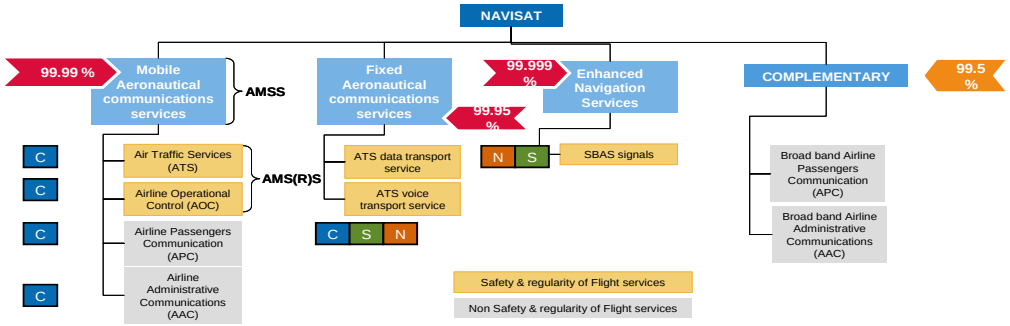
| | |
|---|---|
| **Dedicated reliable communciations** | ▪ Availability > 99.95% for aeronautical mobile satellite communications<br>▪ Dedicated, reliable VSAT communications to connect remote VHF, radars, ADS-B sensors<br>▪ Dependable customer service, with guaranteed response times |
| **Uniform global coverage** | ▪ Supports the establishment of interoperable VSAT networks over MID-AFI<br>▪ Supports MID-AFI network of RIMS stations VSAT network with required level of high availability |
| **Cost Effective communications** | ▪ Cost effective VSAT for remote connectivity of VHF stations<br>▪ Provides the choice to ANSP to implement remote VHF or AMSS Satcom to address coverage gaps |
| **Supports CNS Capabilities** | ▪ Enabler of ADS-B in remote regions<br>▪ Support for new services (e.g. broadcast aeronautical and meteo data to ANSP & Airlines) |

C N S

## NAVISAT Navigation services will bring benefit for navigation, surveillance,

| | |
|---|---|
| **Improved Positional Accuracy** | ▪ Would enable improvement of airspace and route management in MID-AFI<br>▪ Relay of GNSS integrity information to aircraft enables real-time pilot awareness of GNSS integrity; with alerts for degradation and failures, required for compliance with PBN<br>▪ Enabler of Performance Based Navigation and 30/30 separation<br>▪ SBAS has the potential to optimize complex operations in TMAs with benefits for safety, capacity, flight efficiency and environmental concerns |
| **Reduced reliance on expensive equipment** | ▪ Has the potential to enable more direct and efficient routings with overall improvements to airspace usage<br>▪ Relay of GNSS integrity to aircrafts, contributing to real-time pilot awareness of GNSS integrity<br>▪ Enable regional airports to open up to IFR traffic, with GNSS SBAS procedures |
| **Cost effective Communications** | ▪ Modest equipage costs for SBAS<br>▪ Installation of ILS costs between $1 m and $1.5 m while publishing an SBAS procedure costs $50k<br>▪ Annual ILS maintenance costs can be as high as $85,000 per runway<br>▪ Maintenance costs of an SBAS procedure is less than $3000 every 2 years |
| **Green Tailored Approaches** | ▪ Positional accuracy facilitates lower power, Continuous Descent Operations (CDO) with maximized emission efficiency<br>▪ SBAS has the potential to optimize complex operations in TMAs with benefits for the environment (e.g. fuel burn reduction, noise reduction) |
| | ▪ SBAS was recently selected for Airbus's forthcoming A-350XWB |

# AVAILABILITY




Availability %

- Provision of safety and regularity of flight service requires an high availability and reliability of the system
  - 99.999% => maximum cumulative outage is 5 minutes per year
  - 99.99% => maximum cumulative outage is 52 minutes per year
  - 99.95% => maximum cumulative outage is 4:20 hours per year
  - 99.5% => maximum cumulative outage is 40 hours per year

3