ATU-R STRATEGY

for

Optimum Acquisition, Retention and Utilization of Satellite Resources in Africa

ATU-R Strategy 001-0

August 2021

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AFRICAN TELECOMMUNICATIONS UNION
ATU UAT

ACRONYMS

AP30:	Appendix 30 of the Radio Regulations containing Broadcasting-Satellite Service Plan
AP30A:	Appendix 30A of the Radio Regulations containing Plan for feeder link for Broadcasting-Satellite Service referred to in Appendix 30.
AP30B:	Appendix 30B of the Radio Regulations containing Fixed-Satellite Service Plan
APM:	African Preparatory Meetings for WRC
BR IFIC:	BR International Frequency Information Circular
GPS:	Global Positioning System
GSO:	Geostationary Satellite Orbits
LEO:	Low Earth Orbit
MEO:	Medium Earth Orbit
NGSO:	Non-Geostationary Satellite Orbit
RRB:	The Radio Regulations Board
WP4A:	Working Party 4A under Study Group 4 of the ITU-R
WRC:	World Radiocommunication Conference

1 EXECUTIVE SUMMARY

Any satellite needs two basic scarce resources to operate; namely, the radio frequency spectrum and an Orbital position in case of GSO satellite or orbit in case of NGSO satellite in the Space where it will be located. It is within the mandate of the International Telecommunication Union (ITU) to manage these resources using an international treaty known as the Radio Regulations. The demand for these resources is very high but Africa is yet to adequately leverage these resources to develop its satellite sector.

Specifically, Africa is lagging behind in terms of optimum acquisition, retention and utilization of satellite resources. Several factors have contributed to the current situation. However, the following are the most important:

- Gaps in the Radio Regulations to ensure equitable access to satellite resources by all members of the ITU especially developing countries.
- Gaps in the Radio Regulations to provide adequate protection for the resources allotted for developing countries.
- Gaps in the Radio Regulations relating to the acquisition and retention of satellite resources from the view point of developing countries.
- Lack of adequate resources by African countries to conduct satellite coordination and proper implementation of the procedures on coordination and notification of satellite networks as set out in the ITU Radio Regulations.
- Limited awareness by African decision-makers on the role of satellite technologies in addressing the socio-economic needs of our continent.
- High capital requirements for operationalizing satellite systems.

To ensure the optimum acquisition of satellite resources, African countries should start by restoring their existing satellite resources in the planned bands' Appendices **30, 30A** and **30B**. The two countries namely South Sudan and Eritrea do not have resources in the planned bands. With strong support from the other African states in the ATU membership, South Sudan was accorded a special consideration by WRC-19 as contained in the minutes of the 7th plenary WRC-19 quoted bellow:

"*In relation with the specific case of the Administration of South Sudan, which currently does not have any frequency assignments in the Plans of RR Appendices **30** and **30A**, WRC-19 decided that the Administration of South Sudan may apply Resolution **COM5/3 (WRC 19**) and instructed the Radiocommunication Bureau to accept such submission from the administration of South Sudan.*"

South Sudan alongside the other 31 African countries utilized Resolution **559 (WRC-19)** as well as Article 7 of the Appendix **30B** and filed for satellite resources covering its national territory. The submissions were made in May 2020 and the coordination and related process will continue in preparation for inclusion of these submissions into the App **30, 30A** and **30B** Plans at WRC-23. On

the other hand, Eritrea should use Article 7 of Appendix **30B** to acquire allotment covering its national territory.

In the unplanned bands, African countries could take advantage of satellite resources for Earth Observation satellites and new bands that are being identified in Q[1] and V[2] bands.

The efficient retention of satellite resources can only be achieved if African Administrations appoint dedicated staff and build their capacity to conduct proper coordination. Further steps should be made to amend the Radio Regulations (via the WRC and/or RRB) to ensure that satellite assignments and allotments in Appendices **30, 30A** and **30B** are unconditionally protected.

The optimum use of satellite resources should be in line with the African Space Policy goals that are: addressing user needs, accessing space services, developing the regional market, adopting good governance and management, coordinating the African space arena and promoting intra-Africa and other international cooperation. African countries should consider the following satellite resources depending on the 4 thematic areas proposed in the African Space strategy:

1. Earth Observation satellites: This category requires satellite resources in the unplanned bands mainly NGSO. They are easily accessible. African countries should consider the use of small satellites as they are cost-effective and may provide the same functions as traditional big satellites;
2. Navigation and positioning satellites: Satellite resources in the unplanned bands in both GSO and NGSO should be considered for such systems. Considering the applications of these systems, a continental approach should be considered for efficiency;
3. Satellite communication (including Broadcasting): African countries should consolidate their existing assignments and allotments in the planned bands' Appendices **30, 30A** and **30B** to launch economically viable satellites, as well as, explore strategic opportunities for consolidated utilization of orbital resources that may become available under specific circumstances within some international treaties (e.g. Common Heritage under the ITSO Agreement);
4. Space Science and Astronomy: This category uses satellite resources for passive and active applications in both GSO and NGSO. These resources are usually easily accessible. African Administrations should initiate partnerships for capacity building on a group[3] basis with a view to developing a core team that then focuses on details for what can be done for the continent even prior to acquisition of resources.

[1] A range of frequencies in 30/40 GHz bands
[2] A range of frequencies in 40/50 GHz bands
[3] Meaning two or more countries or sub-region level

2 INTRODUCTION

As specified in the report of the state of satellite resources for Africa, up to 47%[4] of African satellite resources in Broadcasting-Satellite Service Plan bands (AP**30**, **30A**) have been degraded and cannot be used any more (see figure 1).

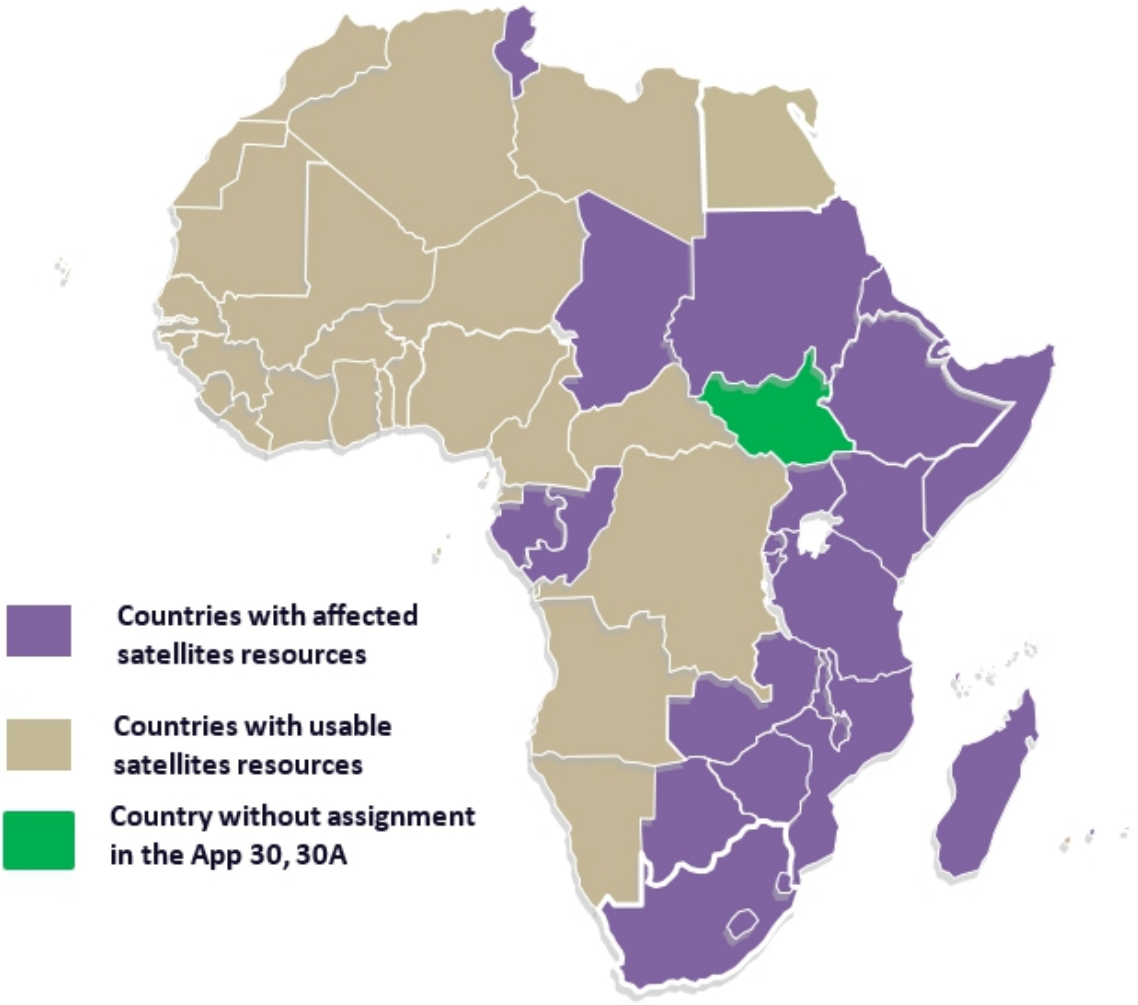

Figure 1: African countries with affected assignments in AP30, 30A

In the Fixed-Satellite Service Plan band (App **30B**), 15% of the African resources can no longer be utilized because they were degraded (see figure 2). When it comes to non-planned bands that use first-come, first-served approach, only five countries namely Algeria, Côte d'Ivoire, Egypt, Ethiopia and Nigeria have acquired satellite resources. This situation cannot be blamed on African countries only. There is also a problem in the provisions of the Radio Regulations governing satellite resources. The following sections highlight gaps that are in satellite resources acquisition, retention and use both on the side of Administrations (countries) and the side of the ITU Radio Regulations.

[4] This figure may be further increase should more assignments enter in the List in application of §4.1.18 of Appendices **30** and **30A**.

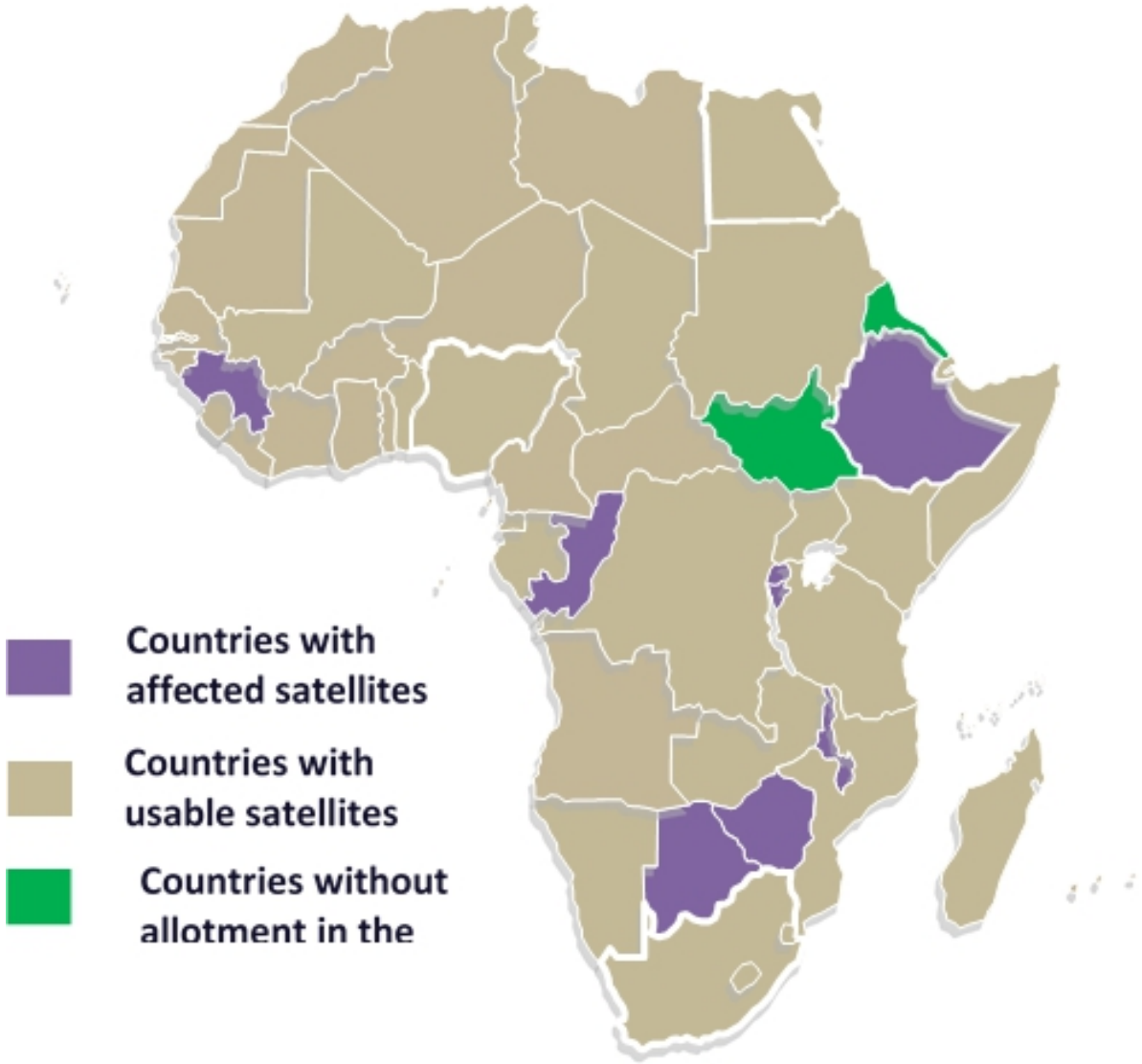

Figure 2: African countries with affected satellite allotment in App 30B

2.1 Gaps in satellite resources acquisition

In the planned bands' Appendices **30, 30A** and **30B** the acquisition of satellite resources is almost automatic through the adoption of Space Services Plans by a WRC. It is the right of every Member State of the ITU to have satellite resources in Appendices **30, 30A** and **30B** Plans for covering its national territory. That is why every African country has an assignment and an allotment in Appendices **30, 30A** and the Appendix **30B** Plans respectively, except South Sudan and Eritrea who joined the ITU after the Plans had been developed. To access capacity beyond the Plans through additional uses (Appendices **30, 30A**) or additional systems (Appendix **30B**), coordination procedures based on first-come, first-served basis similar to non-planned bands apply.

The satellite resources acquisition in non-planned bands still has a big room for improvement on the continent. The non-planned satellite resources are accessed on a first-come, first-served basis. This

means that when an Administration files or registers a satellite network before a given Administration, it obtains priority over that Administration. To coordinate with that Administration is a very long and complicated process that requires both human and financial resources. In addition to that, an Administration that files a satellite network in the non-planned band must immediately launch a satellite within seven years' regulatory period. Since many African countries have not yet initiated projects for launching satellite, it might not be in their interest to initiate a long and complicated satellite registration that will be deleted due to a lack of financial means to launch a satellite. Another issue that has hindered the acquisition of satellite resources has been the abuse of Radio Regulations by some Member States of the ITU who register satellites that will never be launched just to block newcomers. This phenomenon is known as "*paper satellites*".

2.2 Gaps in satellite resources retention

The retention of allocated satellite resources for African countries is critical in the planned bands' Appendices **30, 30A** and **30B**. Two factors contribute to this problem: loopholes in the Radio Regulations as well as weaknesses of African Administrations in handling satellite coordination.

§ 4.1.10 of Article 4 of Appendices **30, 30A** and §6.15 of Article 6 of Appendix **30B** provides room for affecting assignments and allotments in Appendices **30, 30A** and Appendix **30B** respectively. According to these provisions, if an Administration with assignment or allotment in Appendices **30, 30A** and **30B** does not respond to coordination requests after a reminder from the ITU, it is deemed to have accepted harmful interferences caused to its satellite assignment or allotment. Yet, it is the right of every Administration to have an assignment and allotment in Appendices **30, 30A** and **30B** for covering its national territory. The Radio Regulations should ensure the preservation of that right regardless of actions of other Administrations.

Several African Administrations, on the other hand, do not respond to coordination requests within the prescribed deadline. This is caused by several reasons; One reason is that several African countries do not have adequate resources to receive, analyse and reply to satellite coordination requests on time. Faulty Telefax or delays in couriers' reception may affect the capability of an Administration to respect the deadlines.

In any case, the main reason remains the limited understanding of satellite coordination procedures and the human capacity to properly apply the procedures.

2.3 Gaps in satellite resources utilisation

The satellite sector is capital intensive. A single Geostationary Satellite may require an investment of up to half a Billion US Dollars, which is a very discouraging factor for African countries that have several other priorities. However, thanks to new developments in satellite technologies, especially in launching costs, the required investment for launching satellites has significantly reduced.

The issue of capital intensity contributes to low uptake in the satellite sector by African countries but the main factor is lack of awareness on the value of satellite by decision-makers. A satellite is still considered a luxury while it can solve several issues that the African continent is facing such as connectivity gap, natural resources management, etc.

The miniaturization of electronic components has also positively impacted the satellite industry where micro and Nanosatellites can provide critical services in sectors such as agriculture and mining, disaster management, etc. These small satellites do not require big investments and the required satellite resources are still easily accessible.

3 STRATEGY FOR SATELLITE RESOURCES ACQUISITION

Except for South Sudan and Eritrea, all African countries have Broadcasting and Fixed satellite resources in the planned bands for covering their national territories. Every Member State of the ITU has the right to these resources. The main issue is the preservation of these resources. The following sections propose a recommended strategy for South Sudan and Eritrea for obtaining satellite resources in the planned bands and a strategy for African countries with degraded satellite resources to restore them.

3.1 Strategy for Eritrea and South Sudan for acquiring satellite resources in the planned bands

The Radio Regulations contain provisions that new Member States of the ITU that do not have satellite resources in Appendices **30, 30A** and **30B** must follow.

A new Member State of the ITU wishing to obtain Broadcasting satellite resources in Appendices **30, 30A** must follow Article 4 of that Appendix to include a new assignment in the list. After completion of Article 4 procedures, that Administration may request the following World Radiocommunication Conference to transfer that assignment in the Plan. However, South Sudan was among the countries that benefited from Resolution **559 (WRC-19)** which provided an opportunity for countries with affected satellite resources in Appendices **30, 30A** to obtain new orbits. After completion of the Article 4 procedure that was already initiated, South Sudan can request WRC-23 to register its new assignment in Appendices **30, 30A** Plan.

Figure 3 below provides steps and important Radio Regulation provisions to be considered by South Sudan to obtain an assignment in the Appendices **30, 30A**.

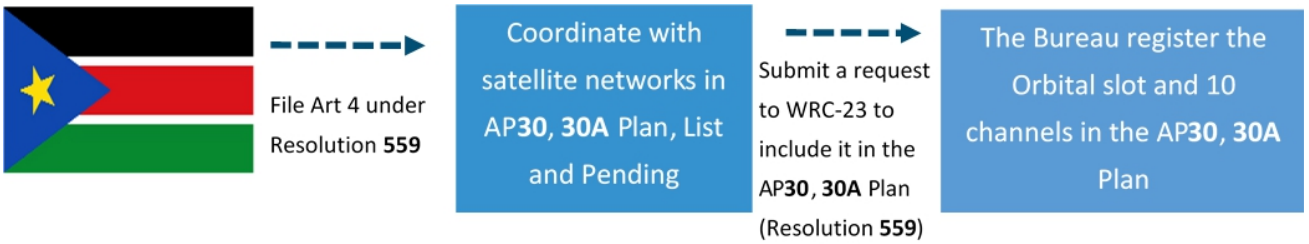

Figure 3: Procedure to be followed by South Sudan for acquiring an assignment in the AP30, 30A

Both South Sudan[5] and Eritrea missed an opportunity for having an allotment in the Appendix **30B** that contains Fixed Satellite Services at the time of establishing the Plan because they were not Member States of ITU. Both Administrations can use Article 7 of Appendix **30B** which contains the procedure for the addition of a new allotment to the Plan for a new Member State of the Union. Figure 4 below shows steps and Radio Regulation provisions that South Sudan and Eritrea could follow to obtain allotments in Appendix **30B**.

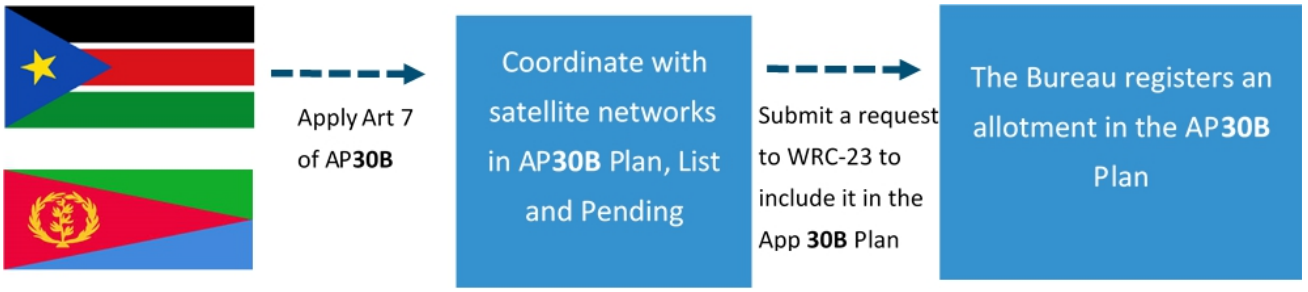

Figure 4: Procedure for South Sudan and Eritrea for acquiring an allotment in the App 30B plan

3.2 Recovery strategy for degraded African satellite assignments and allotments in the App 30, 30A and App 30B respectively

Appendices **30, 30A** and Appendix **30B** contain Plans for Broadcasting-Satellite Service and Fixed-Satellite Service, respectively. The Plans were created to ensure that every Member State of the ITU obtains satellite resources to cover its national territory for Broadcasting and communication services, respectively. However, resources for many African countries were degraded due to a lack of proper coordination. The following sections propose a strategy for African countries to recover their resources in Appendices **30, 30A** and **30B**.

3.3 APPENDICES 30, 30A

African countries' assignments in Appendices **30, 30A** Plan have been degraded over the years due to lack of proper coordination with other satellite networks especially those in Appendices **30, 30A**

[5] The request of South Sudan under Art.7 of Appendix **30B** as a new Member State was received by the Bureau on 28.04.2020 and it was published in Special Section AP30B/A6A/609 annexed to the BR IFIC 2944 of 20.04.2021.

List. Currently, satellite assignments in Appendices **30, 30A** for thirty-one (31) African countries cannot be utilized.

Fortunately, efforts to recover these assignments were initiated during the last WRC-19 with the adoption of Resolution **559 (WRC-19).** This Resolution provided a priority to the 31 African countries with degraded assignments to choose suitable orbital positions to replace their affected assignments among the orbitals slots that became available as a result of lifting limitations by WRC-19 between 37.20 W to 100 E and further west than 37.2°W. All the 31 countries including South Sudan that did not have any assignment in the App **30, 30A** Plan managed to find suitable orbits and filed them to the ITU. The process was initiated but the journey to achieve full recovery of the resources is still long. Different stakeholders involved have to continue working together until the whole process is completed. Table 1 below shows all stakeholders involved in ensuring a successful recovery process of satellite resources for the 31 countries and their responsibilities:

Table 1: Stakeholders involved in the process of recovering African satellite resources in AP30, 30A

Stakeholders	**Responsibilities**
The 31 African Administrations	▪ Conduct coordination with existing satellite networks in the AP**30**, **30A** Plan, List and Pending submissions**,** affected and affecting satellite networks (Plan, List, and pending-with high filing priority) including non-planned and Article 2A as well as affected assignments for terrestrial services. - Submit at the same time Part B for having those new assignments entered in the List for WRC-23 within the prescribed time frame set out by the BR; - Continue to protect their current Plan assignments and the new assignments; - Prepare a Multi-countries contribution to WRC-23 requesting replacement of the affected satellite resources in the AP**30**, **30A** with new identified orbital resources according to RR 4.1.27 of AP**30**, **30A**; - Prepare a contribution for the WRC-23 proposing a permanent protection of Resolution **559 (WRC-19)** submissions as well as existing all other assignments for African states in the Plan of AP**30** and **30A**
The ATU Secretariat	- Send letters to the 31 African Administrations reminding them their responsibilities mentioned in the row above; - Create a liaison group comprised of at least one focal person from each of the 31 Administrations for coordinating their efforts on different tasks they have to fulfil; - Make necessary follow-up with the ITU-R Bureau where necessary; - Organize a workshop for the 31 African countries (with open invitation to all African countries) for sharing experiences and invite ITU experts to facilitate if possible, in consultation with the ATU WRC-23 working groups on satellites issues. Otherwise, this could also be done during APM (ATU Preparatory Meetings for WRC-23) meetings. The objectives of such a workshop could typically be: a. Technical examination needed for proper satellite coordination;

	b. ITU software tools.
The African Preparatory Meeting for WRC-23	- Coordinate the process of contribution preparation and submission to WRC-23 - seek endorsement from all African countries including those that are not directly impacted; - Develop a proposal as part of the AFCPs as relates to: a. Changing in commenting procedure in relation to affected assignments/allotments in the Plans; b. Protect the new orbital slots submitted by the 31 African countries; c. Approve replacement of the affected assignments for the 31 African countries in the Appendices 30, 30A by the new ones submitted under Resolution 559 (WRC-19).
ATU WRC-23 Leadership	- Lobby for support from other regional organizations on the submitted AFCP - Continue to seek the necessary goodwill and support for African Proposals as relates to the principle of equitable access to satellite resources in the diverse fora and instances.
ITU Radiocommunication Bureau	- Provide support and advice to the 31 African Countries when requested
The World Radiocommunication Conference	- Consider with favour the AFCPs and adopt an appropriate decision in the spirit of equitable access to satellite resources
The Radio Regulation Board	Consider with favour the African Proposal and adopt the relevant decision providing guidance to the bureau on how best to implement the WRC decision.

It is also important to understand several steps that will be made and prepare for each step accordingly. Figure 5 below shows the important steps of the recovery process for Appendices **30, 30A** assignment.

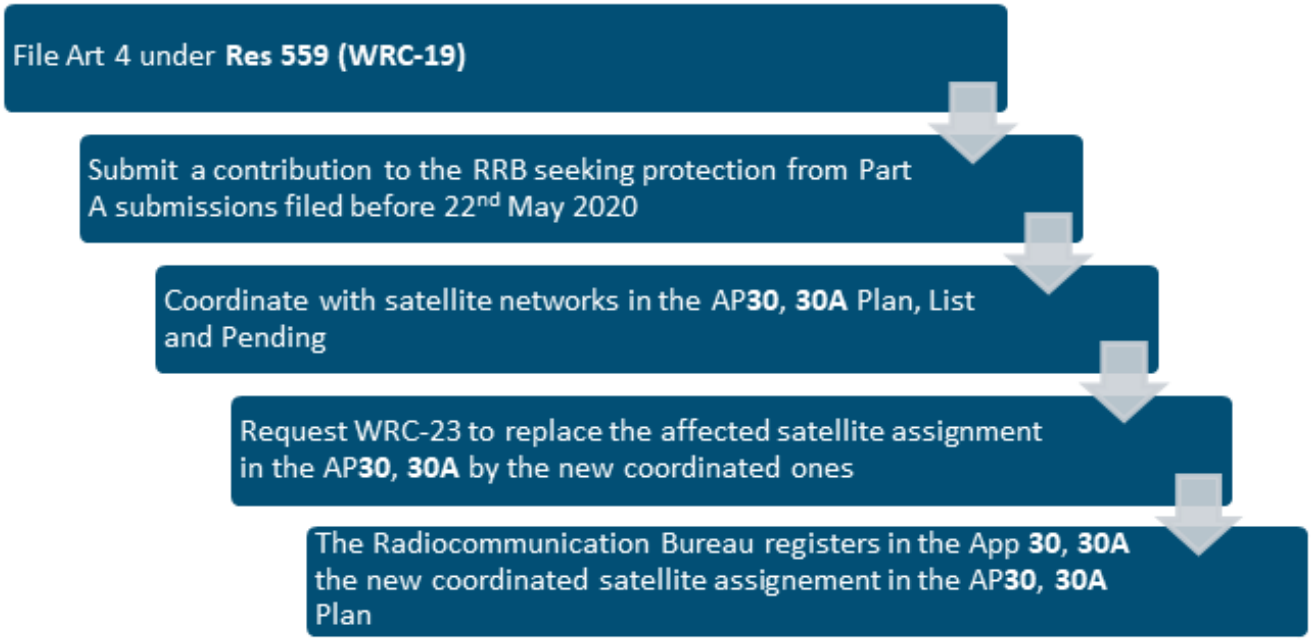

Figure 5: Process for recovering affected satellite assignments in AP30, 30A by African countries

3.4 APPENDIX 30B

The Plan for the fixed-satellite service (FSS Plan) in the 6/4 GHz and 12-13/10-11 GHz frequency bands was adopted by the World Administrative Radio Conference in 1988 (WARC ORB-88) on the Use of the Geostationary-Satellite Orbit and the Planning of the Space Services Utilizing It. Appendix **30B** of the Radio Regulations contains the FSS Plan, the procedures and associated provisions to implement it:

In the 6/4 GHz:

- 4 500 and 4 800 MHz (space-to-Earth);
- 6 725 and 7 025 MHz (Earth-to-space).

In the 12-13/10-11 GHz:

- 10.70 and 10.95 GHz (space-to-Earth);
- 11.20 and 11.45 GHz (space-to-Earth);
- 12.75 and 13.25 GHz (Earth-to-space).

The FSS Plan is a worldwide Allotment Plan. An allotment comprises:

- a nominal orbital position;
- a bandwidth of 800 MHz (up-link and down-link) in the frequency bands listed above;
- a service area for national coverage.

The World Radiocommunication Conference 2007 (WRC-07) modified the Appendix **30B** procedures together with the characteristics of the FSS Plan and updated associated sharing/protection criteria.

The modification of the FSS Plan characteristics in terms of earth station antenna and receiving noise temperature is summarized in the table below.

Before WRC-07	As from WRC-07
In the 6/4 GHz: - *Diameter: 7 meters* - *Earth station receiving system noise temperature: 140 K* - *Space station receiving system noise temperature: 1000 K* *In the 12-13/10-11 GHz:* - *Diameter: 3 meters* - *Earth station receiving system noise temperature: 200 K* - *Space station receiving system noise temperature: 1500*	*In the 6/4 GHz:* - *Diameter: 5.5 meters* - *Earth station receiving system noise temperature: 95 K* - *Space station receiving system noise temperature: 500 K* *In the 12-13/10-11 GHz:* - *Diameter: 2.7 meters* - *Earth station receiving system noise temperature: 125 K* - *Space station receiving system noise temperature: 550 K*

3.5 Special procedure for introduction of an additional system in the List or for conversion of allotment into assignment

WRC-19 adopted Resolution 170 "*Additional measures for satellite networks in the fixed-satellite service in frequency bands subject to Appendix **30B** for the enhancement of equitable access to these frequency bands*". This Resolution contains a special procedure applicable only once by administrations for introduction of an additional system in the List or for conversion of allotment into assignment. To that end, an administration or a group of administrations having no assignment in the List of Appendix **30B** or assignment submitted under § 6.1 of Appendix **30B** for the introduction of an additional system or conversion of an allotment beyond the envelope can apply that special procedure. Furthermore, if an administration has already submitted a Part A, it may withdraw the Part A submission in order to apply this procedure. If it is a group of administrations all of them have to withdraw the existing Part A submissions; or it may modify the characteristics at the time of Part B submission in order to make it compliant with Resolution **170 (WRC-19)** as long as the modifications are inside the envelope of the Part A submission. It should be noted that the coverage and service areas are restricted to the territories of applying administrations and test-points shall be the same as the allotment(s).

In accordance with Appendices 1 and 2 to Attachment 1 to Resolution **170 (WRC-19)**, Annex 4 to Appendix **30B (WRC-19)** provides the criteria for protection of submissions received in accordance with this Resolution.

As of IFIC 2943/06.04.2021 the Bureau has not yet received any submission in accordance with this Resolution.

3.6 Request for a new allotment under Article 7 of Appendix 30B

New ITU Member States that do not have a national allotment in the Plan or an assignment stemming from the conversion of an allotment may obtain a national allotment by applying Article 7 of Appendix **30B**.

In accordance with § 7.3 of Article 7 of Appendix **30B**, the request for a new allotment is processed ahead of submissions received under Article 6 of Appendix **30B** that have not yet been examined. The Bureau is requested to propose orbital positions. Nevertheless, the requesting administration shall indicate the final orbital position.

The request for a new allotment would be included in the FSS Plan if the Bureau's examination under § 7.6 of Article 7 of Appendix **30B** leads to a favourable finding; otherwise the proposed new allotment would be treated as a submission under § 6.1 and would be treated by the Bureau ahead of any other submissions received under Article 6, except for submissions which were already under examination under § 6.5 by the Bureau at the time of completing the examination of the request of the new Member State under § 7.5.

In any case, the request for a new allotment would be protected in accordance with Annex 4 to Appendix **30B (WRC-19)**. The only difference for the proposed allotment transferred to Article 6 for further coordination, is the degradation of aggregate overall C/I of 0.25 dB instead of 0.05 dB, which is applicable for an allotment. In addition, §6.25 is applicable to the proposed allotment until it is included in the FSS Plan.

As of August 2021, the Bureau had received 7 requests for new allotment under Article 7 of Appendix 30B. All of them have been processed and published respectively in Special Sections annex to BR IFICs 2936 of 22.12.2020 (SRB00000); 2938 of 26.01.2021 (MKD00000); 2941 of 09.03.2021 (BIH00000); 2943 of 06.04.2021 (MDA00000); 2944 of 20.04.2021 (SSD00000); 2946 of 18.05.2021 (GEO00000) and 2947 of 01.06.2021 (HRV00000).

3.7 Situation for Africa

The situation in the Appendix **30B** containing Fixed satellites resources is better.

There are only two (2) African countries (South Sudan and Eritrea) which do not have national allotments in the FSS Plan and, therefore, they may wish to submit their requests to BR under Art.7 of Appendix 30B for a new allotment in the Plan as a new Member State of the Union[6]. Further,

[6] South Sudan submitted the relevant request under Art.7 of Appendix 30B to the Bureau on 28 April 2020 and proposed allotment was published in Special Section AP30B/A6A/609 annexed to the BR IFIC 2944 of 20.04.2021.

upon completion of the relevant procedure, these Administrations may request WRC-23, under provision 6.35 of Art.6 of Appendix **30B**, to consider the inclusion in the Plan of a new allotment over its national territory as the new Member State.

To facilitate for a new Member State of the Union to have its national allotment in the FSS Plan, the African countries may wish to submit a common contribution through the ITU-R Working Party 4A (or directly to WRC-23) under Agenda Item 7 of WRC-23 with a proposal to change the current procedure of Article 7 of Appendix **30B**. Based on this update the request which have been made under Article 7 of Appendix **30B** needs to be coordinated with only allotments in the Plan and assignments in the List recorded at the time of Article 7 request. Pending networks, submitted to the Bureau under Article 6 of Appendix **30B**, shall not be considered.

Also, there are eight (8) African countries with unusable satellite allotments in 12-13/10-11 GHz bands of Appendix **30B**. These Administrations are urged to initiate relevant coordination (bilateral or multilateral) discussions with the Administrations, having relevant assignments in the List, sources of degradation of the reference situation of the concerned allotments as soon as possible. During these coordination discussions the notifying Administrations of the networks in the List should be invited:

1. to make the efforts to bring the parameters of the coverage area of their satellite networks in line with their service areas as much as possible;
2. to use shape beams in the future generation of the networks with a goal to reduce degradation of national allotments of concerned African countries.

4 STRATEGY FOR THE ACQUISITION OF SATELLITE RESOURCES IN UNPLANNED BANDS

1 The unplanned bands are accessed on a first-come, first-served basis. This makes it extremely complicated to access these resources since it requires coordinating with existing satellite networks that filed before a new filling. The situation is more complicated for the GSO orbital resources. Satellite resources in the Ku[7] and Ka[8] bands are extremely congested to the extent that it is almost impossible to find any available resources.

2 African countries wishing to acquire the satellite resources in the unplanned bands should explore the newly identified bands such as Q and V bands instead of looking for resources in the congested Ku and Ka bands. The main issue is that, the more African administrations wait the more satellite resources in these bands get exhausted. By the time these Administrations are ready to build satellite networks in Q and V bands they may find themselves without available resources.

[7] Frequencies in the range of 10-15 GHz bands
[8] Frequencies in the range of 17-30 GHz bands

3 A better way to leverage Q and V band is proposing to the ITU a combination of first come, first served approach and a planned approach to ensure availability of satellite resources in future when developing countries will be ready to exploit these bands. The ITU can use the current Plans in Appendices **30**, **30A** and **30B** as a model in proposing a new Plan in the Q & V bands. African countries should consider introducing an Agenda Item in WRC-23 proposing a new Plan in Q & V bands.

4 Under the ITSO Agreement there is a provision that could enable the acquisition of orbital resources that are not being used by Intelsat. A proposal could be initiated to ITSO's 40th Assembly of Parties (AP-40) that requests for priority consideration to the African region in consideration of use of these resources. A process can then be agreed that would fast track use of these resources under an arrangement that may involve partnerships to use an Operator that has the ability to use them.

5 STRATEGY FOR SATELLITE RESOURCES RETENTION

The acquisition or recovery of satellite resources is not sufficient to ensure the sustainability of the African satellite sector. African Administrations should exercise the utmost efforts to ensure long-term protection of the acquired resources. The challenging part of retention is satellite resources in the planned bands. The unplanned bands are usually filed when there is a real project for launching a satellite. An existing or real satellite is easier to protect since Administrations put in place the required resources to follow up on the protection of the resources.

This section mostly focuses on retention or protection of assignments and allotment in Appendices **30**, **30A** and **30B**. However, the main considerations for the retention of the unplanned bands are also provided. It provides proposals for immediate measures to put in place to ensure that the existing and restored satellite resources are protected. A strategy for permanent protection of resources in the planned band is also provided.

5.1 Satellite resources retention in Appendices 30, 30A and 30B

It is the right of each Administration to have usable satellite resources to cover its national territory. However, African countries have lost their rights due to coordination issues. The main issue is the impact caused by satellite networks in Appendices **30**, **30A** and **30B** Lists that are filed for additional use/additional system (beyond national territories). Most of the African countries receive a coordination request from these satellite networks but do not respond. If no response is made to a coordination request after four months, it is deemed that the Administration that received the coordination request does not accept the impact on its satellite resources. The Administration seeking coordination can request assistance from the ITU Radiocommunication Bureau to re-send the coordination request. If the Bureau resends the coordination request and the Administration does not react within thirty (30) days, it will be deemed to have accepted the impact caused on its

satellite network. This is the main cause of the degradation of satellite resources for many African countries.

The followings are recommended for African countries to avoid this situation:

1. Dedicate a staff or a team of staff in the Administration to follow up and propose a reply for all coordination requests received. These staff should receive dedicated training on handling satellite filings and coordination and should be supported to attend all Radiocommunication Seminars organized by the ITU and ATU; the ATU General Secretariat should consider enhancing its **assistance** to Administrations in handling satellite filings and coordination as individual countries develop their own capacity.

2. Register managers for the ITU e-Communications and e-Submission to ensure that all coordination requests are received on time. This helps to avoid a situation where Administrations miss the deadline for replying to coordination requests.

3. The staff should regularly check the dedicated ITU website on satellite issues, download and examine BR IFIC ISO copies from the ITU website. It is much convenient downloading BR IFIC than waiting for the post office to deliver the BR IFIC DVD;

4. Reply to coordination requests within the set deadline since any coordination submitted after the deadline is not considered by the ITU. It is important to note that Administrations that use e-Communication tools do not need official letters signed by the DG/CEO which helps in avoiding delays.

5. When an Administration does not understand the content of the coordination request, to seek assistance from the Bureau. The staff of the ITU is always available for helping Administrations for any technical or administrative issues. This could be achieved with a simple email to the BR email: brmail@itu.int

In parallel with the above-mentioned measures, African countries should propose a review of the Radio Regulations to:

1. Ensure that the time stipulated for the administrations to respond to the request for assistance sent by the BR is extended by a sufficient period instead of the 30 days currently provided;

2. Ensure that the regulations pertaining to this aspect are aligned between the planned and non-planned services.

This should be channelled through the ITU Working party 4A study cycles in preparation for WRC-23.

Beyond the usability of African satellite resources in the Appendices **30**, **30A** and **30B**, there is an issue of attractiveness of the resources especially Appendix **30B**. For example, the size of antennas in the Appendix **30B** are 5 m in 6/4 and 2.7 m in 13/10-11 GHz which make them less attractive. Most of Article 6 submissions for additional systems use much smaller antenna sizes. In addition to that, there is less room for manoeuvre if an Administration wishes to use smaller antenna. African Administrations together with other developing countries can propose a study under Agenda Item 7 in the WP4A for improving parameters of satellite allotments in the Appendix **30B**.

5.2 Satellite resources retention in the unplanned bands

The unplanned bands are not particularly affected by the issue of retention. Nevertheless, Administrations under the process of the satellite filing should be mindful of the following principles for retaining or protecting their resources:

1. Respect deadlines mentioned in the Radio Regulations for responding to coordination requests: Like the planned bands, unplanned bands also receive coordination requests with a deadline for replying. If an Administration receiving coordination does not react to a coordination request within the four months, it is deemed to have accepted impact caused to its satellite resources (see **ATU Handbook on Satellite Filling and Coordination** for details).

2. Respecting the deadlines for notification and bringing into use a satellite network: satellite filing process for satellite networks in the unplanned bands is seven (7) years after which the satellite network must be brought into use. If the ITU Radiocommunication Bureau does not receive a confirmation that the satellite network has been brought into use after its reminder, it cancels the frequency assignment. The deadlines for notifying or confirming the date for bringing into use are easily forgotten.

Figure 6 below shows some deadline to keep in mind during the seven (7) years regulatory period to protect unplanned satellite resources.

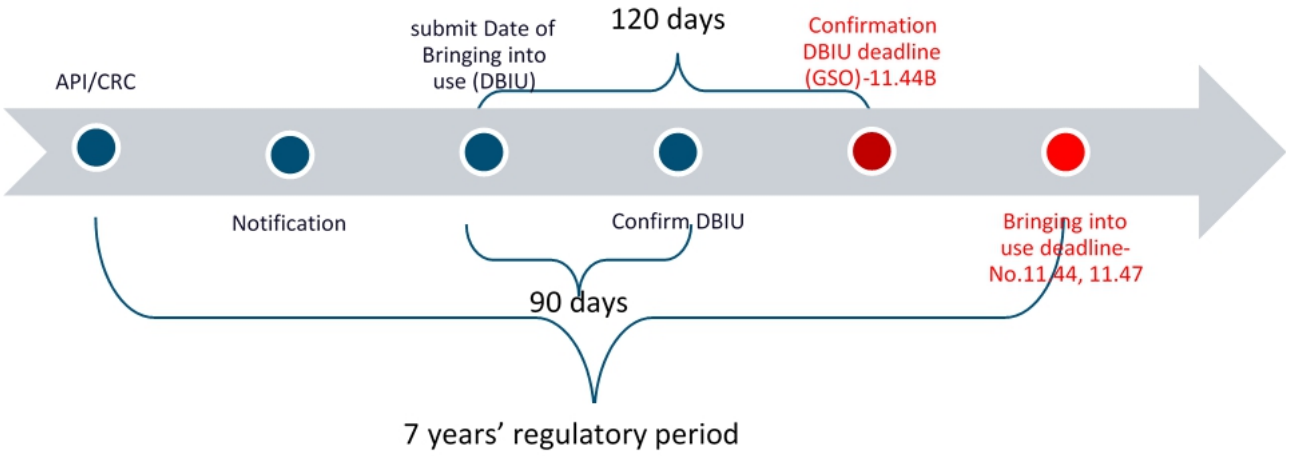

Figure 6: Timeline for unplanned satellite filing with key deadlines

6 STRATEGY FOR SATELLITE RESOURCES UTILISATION

Satellite utilization should take into consideration the **African Space Policy** and the **African Space Strategy.** **(see https://au.int/sites/default/files/documents/37434-doc-au_space_strategy_isbn-electronic.pdf)**

The **African Space Policy** outlined the following six goals for the African Space Program:

1. Addressing user needs
2. Accessing space services
3. Developing the regional market
4. Adopting good governance and management
5. Coordinating the African space arena
6. Promoting intra-Africa and other international cooperation

Four (4) Thematic areas have been proposed in the **Space Strategy** to achieve the above-mentioned policy goals:

1. Earth observation
2. Navigation and Positioning
3. Satellite Communications including Broadcasting
4. Space Science and Astronomy

Considering the status of African satellite resources, Figure 7 below summarizes proposals for optimum use depending on the Thematic area to achieve African Space policy goals.

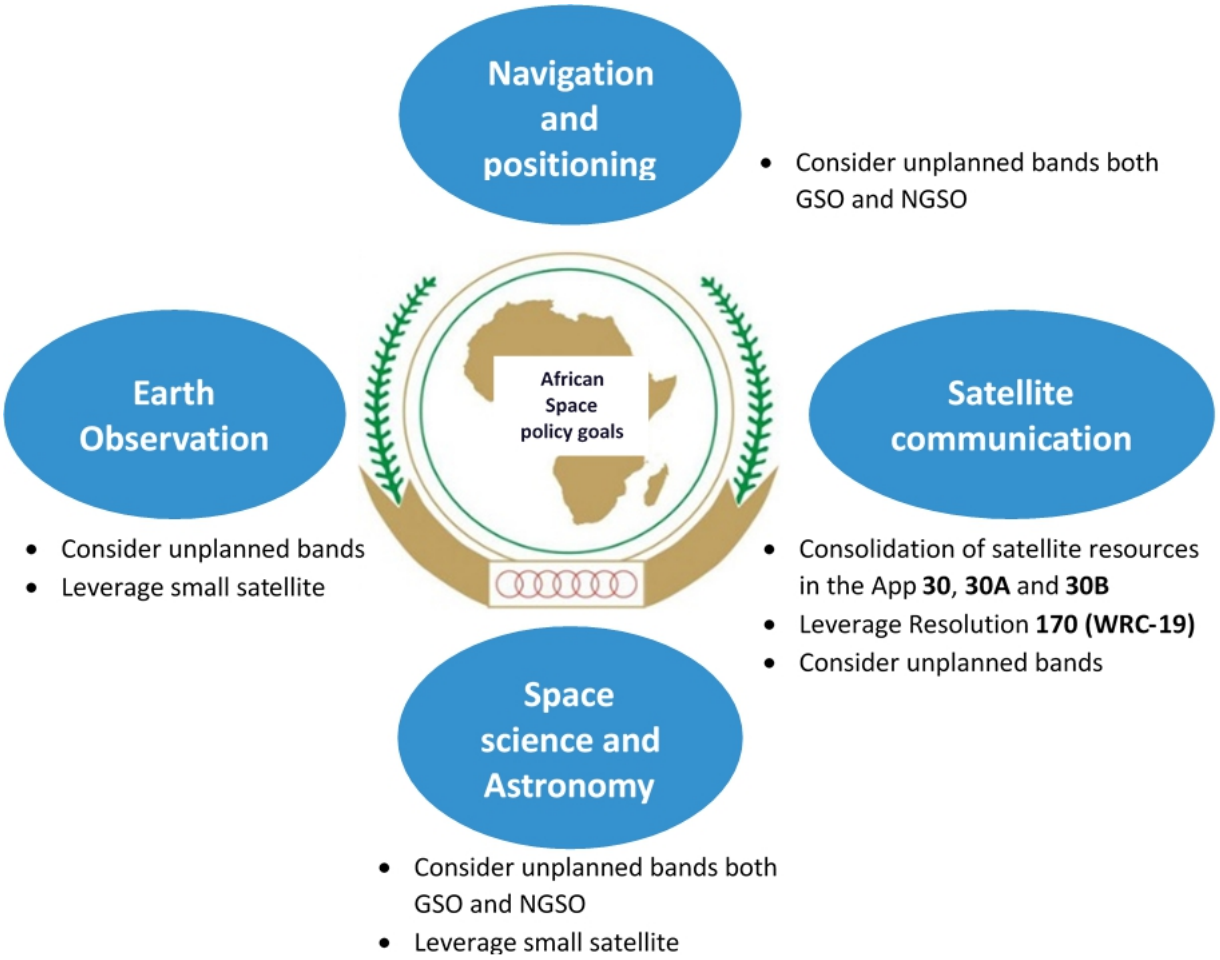

Figure 7: Satellite resources use aligned with Africa Space policy and strategy

6.1 Satellite resources for Earth Observations

Earth Observation is one of the areas that are considered strategic for achieving Space policy goals. These satellites are critical in the management of scarce resources such as water, swamps, mining resources, etc. They can also be used in agriculture for yield estimation, monitoring and planning. The good part is that satellite resources for such satellites are relatively easy to access.

Satellites used for Earth Observation use NGSO orbits in the unplanned bands. This is because they need to be close to the Earth for better resolution of the camera or radars. Using Low Earth Orbits (LEO) or Medium Earth Orbits (MEO) requires launching a constellation to cover an area of interest in a longer period. The development in small satellite technologies has significantly lowered the cost of launching such satellites.

African countries or Regional Economic Communities (RECs), should consider joining their resources to launch a constellation of Earth Observation satellites to further minimize the investment for each country. Prior to launching, African administrations should consider developing continent-wide

roadmap for implementation that considers capacity building aspects as well as other aspects such as technical, financial, legal, etc.

6.2 Satellite resources for Navigation and Positioning

Africa should not continue to rely on navigation and positioning systems from other regions/countries but rather endeavour to develop its own system. The main reason is that such systems are strategic - they are used for some strategic applications which ideally require ownership.

Satellite resources for such systems are easily accessible. These systems use unplanned bands in both NGSO and GSO orbital resources. However, on the other hand, they require heavy investment and takes some time to have a functional system. Therefore, it is recommended that Africa should consider a continental approach for such a project. Prior to launching, here too African administrations should consider developing continent-wide roadmap for implementation that considers capacity building aspects as well as other aspects such as technical, financial, legal, etc.

6.3 Satellite resources for communication (including Broadcasting)

Communication is a very critical area for the continent. A big part of the African population does not have access to connectivity. A satellite can be leveraged to bridge the connectivity gap, especially in rural areas.

There is a need to ensure that satellite services are adequately protected from interference to cover large geographic areas due to their broad reach. Some of the satellite applications are:

1. Wireless Extension Services
2. Corporate Networks
3. Maritime Communications
4. Aviation Security
5. Telemedecine
6. Distance Education
7. Disaster Preparedness
8. TV distribution
9. Internet Connectivity

The broadcasting sector can also benefit from available satellite resources. Considering the size of the continent, it is almost impossible to provide access to Broadcasting services for all African citizens using terrestrial infrastructure.

Two types of satellite resources that can be considered for providing communication and broadcasting services namely satellite resources in the App **30**, **30A** and **30B** as well as NGSO

constellation in the unplanned bands. However, the satellite resources in the unplanned bands are not easily accessible and the constellation of satellite communication requires a relatively heavy investment.

For a single country to use its satellite resources for covering its national territory is normally not economically viable at least in the short term. In the long term when the cost of deployment of a satellite network is reduced thanks to the development of technology, the Plan would become useful. Moreover, a group of countries or regional organizations can put together their resources in Appendices **30**, **30A** or Appendix **30B** to launch a satellite that covers a bigger territory beyond a given country. Resolution **170 (WRC-19)** provides a good opportunity that can be leveraged by African countries wishing to join their resources in Appendix **30B**. The Appendices **30**, **30A** provides also an opportunity for a group of Administrations to join their resources to launch a single satellite covering a bigger territory with many channels (more than 10 channels assigned by country).

6.4 Satellite resources for Space science and astronomy

The issue of climate change has become a global challenge. Africa must contribute to understanding the universe and different elements that constitute it. Satellite resources reserved for this domain are easily accessible. Most of the satellites used in Space Science and Astronomy are passive. Individual countries or a group of countries can easily access these resources for their academic Institutions. Another way would be to coordinate studies in Space Science and Astronomy through the African Space Agency.

7 CONCLUSION: RECOMMENDATIONS AND THE WAY FORWARD

Access to satellite resources is a race against time. On the most part, the first Administration to access the resources enjoy protection against all satellite networks that will be filed later. The more African countries wait, the more the continent compromises its chances to access valuable satellite resources. Below are the recommendations for the different stake holders:

7.1 Member States (Administrations) are invited to:

1. **Make** use of the ATU Handbook on Satellite Fillings and Coordination;
2. **Nominate** at least two dedicated experts for handling satellite resources management issues at a national level and join a continental liaison group for sharing knowledge and experience;
3. **Strive** to build capacity of national staff in satellite and other space-based technologies by providing resources needed for proper satellite resource filings and coordination activities through workshops in collaboration with ITU;

4. **Consider** developing continent-wide roadmap for implementation that covers capacity building aspects as well as other aspects such as technical, financial, legal, etc, prior launches.
5. **Create** at least a directorate within the regulator responsible for space-based technologies and management of satellite issues and frequency coordination;
6. **Consider** periodic awareness program for decision makers on the benefit of satellites and other space-based technologies;
7. **Develop** policies and regulations and provide for the implementation of regional/national satellite programs and remove barriers to investment, research, and development of infrastructure needed in the development of regional/national satellite initiatives taking into account **African Space Policy**and **African Space Strategy;**
   (see https://au.int/sites/default/files/documents/37434-doc-au_space_strategy_isbn-electronic.pdf)
8. **Initiate** a national space programme and form study/working groups that brings together various national stakeholders such as the ministry of ICT and Telecommunications, Defence, ICT regulator, academia and other relevant national institutions to pave way forward for exploitation of space-based technologies;
9. **Create** a national space agency with full responsibilities for exploiting satellite resources and other space-based technologies borrowing from the experiences from the national space programme;
10. **Study** the possibility for a satellite filing for additional use regarding the regional shaped beam to be entered in the Lists of Appendices 30, 30A and 30B and propose which Member State should be the Administration for the said filing while taking into account the Cost recovery fee for satellite network filings.

7.2 Regional Economic Communities are invited to:

1. **Initiate** a regional space program and form a study/working groups that brings together member states as represented by members of their national space program or relevant government agencies in charge of satellite and other space-based technologies;
2. **Promote** regional competitive, efficient, innovative, sustainable and citizen focused space projects;
3. **Consider** forming regional space agency responsible for exploiting satellite resources and other space-based technologies within the region;
4. **Take** advantage of economies of scale and mobilize resource to build, launch and operate satellites for regional coverage.

7.3 African Telecommunications Union (ATU) is invited to:

1. **Prepare** as a matter of urgency during the African Preparatory Meetings for WRC-23 contributions for the work of the WRC-23 on the following issues:

    1.1 **Particular** measures for the treatment of Part A submissions filed before 22nd May 2020 that will affect Resolution **559 (WRC-19)** submissions filed by thirty-one (31) African countries. The contribution will depend on the results of the ongoing efforts by the Bureau to ensure that Resolution **559 (WRC-19)** submissions are protected;

    1.2 **Request** the WRC-23 to consider the inclusion in the plan of new allotments over the respective territories of administrations of South Sudan (SSD) and Eritrea (ERI), upon completion of the relevant procedure under Article 7 of Appendix **30B** and following the provision 6.35 of Art.6 of Appendix **30B**, as new member states;

    1.3 **Contribution** through the ITU-R Working Party 4A (or directly to WRC-23) under Agenda Item 7 of WRC-23 with a proposal to change/modify the current procedure of Article 7 of Appendix **30B** to facilitate for a new Member State of the Union to have its national allotment in the FSS Plan;

    1.4 **Propose** to change the commenting procedures in Appendices **30/30A/30B** to fully protect assignments/allotments in Plans;

    1.5 **Make** a request to WP4A to initiate a study for improving parameters of satellite allotments in the Appendix **30B** in line with the modern satellite telecommunication technologies;

    1.6 **Submit** a contribution to the WRC to conduct appropriate studies for additional spectrum for FSS, BSS in the Ka band considering that Appendices **30/30A** and **30B** spectrum resources (orbit positions and associated frequency) are heavily occupied, that makes it difficult for newcomers to get resources for additional use. New approach should be developed and brought to discussion in subsequent WRC. Besides developing new satellite parameters to accommodate new smaller Earth Station, transmitter (Tx) & receiver (Rx) parameters, new frequency bands should be studied and proposed;

2. ATU General Secretariat to **organize** an annual workshop facilitated by ITU experts for capacity building in satellite filing in consultation with the satellite working group and liaison group, as well as, enhance its **assistance** to Administrations in handling satellite filings and coordination as individual countries develop their own capacity.

7.4 African Union Commission (AUC) is invited to:

1. **Capitalize** on the ability/experience of African countries with existing satellite systems for sharing knowledge and skills, strengthening cooperation/collaboration and wider use by the other African countries;
2. **Initiate** an African Space Program and form a study/working groups that brings together member states or regional economic blocks to deliberate on satellite and other space-based technologies;
3. **Undertake** periodic awareness campaigns for African leaders and relevant ministers on the benefit of satellite and other space-based technologies to the continent as part of the implementation of the African Space Programme;
4. **Strive** to timely operationalize the African space agency which will be useful in fostering collaboration between the various national space agencies;
5. **Mobilize** resources from the member states to economically engage in space projects such as building, launching and operation of satellites covering the African continent;
6. **Forge** strategic partnership with the ITU, ITSO, the satellite industry players and the national space agencies to create viable satellite services and products for the benefit of the African population.

ABOUT THIS STRATEGY

Development: This strategy was developed by an ATU Task Group on Satellite Resources from December 2020 to July 2021. This group was led by the following:

Role	Name (Country)
Chair – Task Group	Mr. Abdouramane El-HADJAR (Cameroun representing ECCAS)
Vice Chair – Task Group	Mr. Martins LANGA (Mozambique representing SADC)
Rapporteur	Mr. Leonel Zamba (South Sudan representing EACO)
Rapporteur	Mr. Yetondji HOUEYETONGNON (Benin representing ECOWAS)
Rapporteur	Mr. Ismail ANGRI (Morocco representing North Africa)

Validation: This strategy was validated by a validation forum that was held from 30 to 31 August 2021. The forum was led by the following bureau:

- **Chair**: Valéry Hilaire OTTOU (Cameroun representing ECCAS)
- **Vice-Chair**: Ahmed BORAUD (Niger representing ECOWAS)
- **Rapporteurs**: Stella BANYENZA (Tanzania representing EACO/SADC)
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