MZANSI AEROSPACE

AN AFRICAN EDUCATIONAL INITIATIVE

Aviation, Aeronautical and Space Sciences Focus School

Researched, Conceptualized and Developed

By

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ABSTRACT

1. Tertiary Institutions are confronted with the challenge of unprepared students(NMU Thesis submitted 2014) Most Universities experience high failure rate or “Dropout” rates amongst first year students, which was largely due to a lack of **Readiness** on the part of Learners(Berg 2011.p.83). Readiness refers to whether students have the necessary knowledge, skills, attitude and values required to successfully complete their qualifications in the minimum amount of time(Conly 2008). The main cause for this phenomenon can be ascribed to the fact that, for those learners desiring a career in the **Emerging Sciences and Technologies**, there is little, or no provision made in the CAPS to fostering sciences and many associated technologies, at High School level.
2. While the Academic curriculum is almost sufficiently catered for, and to a lesser extent also Vocational study opportunities, Occupational Oriented, skills Development, technology focussed curricula, are almost entirety absent from Public Schools**. The need to re-image technology into the current CAPS is an imperative.**
3. It is imperative that **we prepare the Youth of today** to meet the Economic, Technological and Geopolitical Space **demands of tomorrow.** Target date 2030.
4. STEM Developments NPC undertook an opportunity study to determine the need for a High School Programme that would mitigate the problems faced in the current Educational Model(s), to meet the National Economic and technological requirements of the future. Of the technology orientated vocations considered in the study, Aerospace Science covered the widest range of subjects and mustering's to meet these requirements. This paper aims at promoting the establishment of a **High School Academy for Aerospace Science** with a **Focus Curriculum for Aviation Studies, Aeronautical and Space Science,** in the Western Cape.

SCOPE

Vision

Prepare our Learners that will be leaders and pioneers in their communities, who lead by example and demonstration of the possible.

Mission

Our mission is to inspire and empower each Learner through exposure to, and experience of, the world of aviation and Aerospace Science.

Core values

- Accuracy, precision, quality
- Innovation, entrepreneurship,
- Perseverance, strength of character

Philosophy

Our philosophy centres on the belief that aerospace science has been responsible for breaking barriers between cultures and making the world a smaller place through innovative and entrepreneurial thinking and problem solving.

We believe that through aerospace science, people are brought closer together, entrepreneurship flourishes and human development is enhanced.

We believe that aerospace science is an exacting pursuit requiring learners to constantly achieve their best.

We believe that the only way to ensure that learners understand the absolute requirements of the aerospace , is for them to live the experience, starting as soon and as young as possible.

An aerospace science learning environment must adopt the accuracy, precision and quality standards that are required of the aviation industry. Accordingly, we will pay strict attention to detail, we will not tolerate any deviation from our goal of producing confident, capable, innovative and entrepreneurial aerospace graduates.

We will not tolerate any behaviour that would reflect adversely on an aviation professional, including any substance abuse, dishonesty, violence or bias of any sort towards others.

STRATEGIC INTENT

1. **Meet the Educational and Economic Imperatives** of the SONA 2023 requirements.

2. **Re-Image Technology** into current Curricula by introducing **4IR STEM** subjects including Aviation Studies, Robotics and Computer Science in a **FOCUS school..**

3. **Provide Aeronautical Educational Training Facilities** to complement Technologies required for **Regional Economic Development** e.g., Agriculture, Tourism, Environmental Protection, Marine-and Maritime Aerial Security Surveillance.

4. **Provide** for inclusion of Astrophysics into the CAPs at Grade 10 to 12 level, in support of the **growing Aerospace Initiatives in the Western Cape** e.g., Hermanus Weather Station(SANSA); Matjiesfontein Artemis Communications Antenna(NASA); South African Astronomical Observatory (SAAO).

5. **Promote Aviation and Aerospace Technologies** as a catalyst for Economic growth in other **related technologies** e.g., New Battery technology; Micro-Satellite and Sensor Manufacturing; Alternative Fuels developments et al.

6. **Provide Learners with a High School Matric(Alt N4) plus an Accredited Aviation qualification.**

EXECUTIVE SUMMARY

- **Business Sector**: **Education:** Aviation Studies, Astrophysics, Astronomy and Rocketry specific.
- **Product and Services**: Four-year High School Academy STEM program, including Aviation Studies, Aeronautics and Space Science**.**
- **Target Marke**t: Grade 8-12(N1-N4) Learners, Co-Ed, plus selected physically disabled Learners.
- **Outlook**: Forecasted growth in a diversified, unique high Technology **Aeronautical and Space domain.**
- **Facilities**: **To be developed**, an Aerospace Science Academy complex with sufficient-all-inclusive facilities, to house 100 learners per annum. Phase 1 to be accommodated in Aircraft Hangar-Type , using Airfield Infrastructure and Air Wing Service Facilities.
- **Owners: Cooperative Partnership School** with Provincial DHE partnering a Private Venture Co and Board of Directors.
- **Motivation for Project:** Success of Incubator Program, AFB Ysterplaat Youth Development Program, and huge forecasted growth in Aviation Skills requirements in the major skills required provinces i.e., Gauteng, KZN , EC, Free State, WC.
- **Timing**: Government Supported top 5 initiatives, Education, Skills Development and Job Creation etc to kick-start the Economy for the 4th Industrial Revolution. **Start-up target date-January 2025.**
- **Businesses,** Both International-and local Corporates are looking to finance these type of Projects, in support of the **Government Skills and Job Creation** plans.
- **Risk. Calculated low risk** in an Internationally forecasted growth and expanding Market.

PROJECT OVERVIEW

- **Vision: A High School Academy for Aerospace Science.**
- **Mission**: To inspire and empower each Learner through exposure to the world of Aviation and Aerospace Science and Technology.
- **Reason D'Etre: Reimaging Technology into the CAPS**, to meet the immense skills shortages required for the Economic and Social development of South Africa.
- **Objectives:**
  - **Establish a Curriculum Focus Aerospace Academy.**
  - **Partner a Public High School or TVET College or Private School ,to integrate a career and academic preparation.**
- **Strategic Plan:**
  - Implement Opportunity outcomes-deliver Graduates with a Matric Bachelors and Accredited Aviation focus subject Certificate.
- **Tactical Plan:**
  - Segment three tier Educational CAPS i.e., Academic, Vocational and Occupational Oriented, into Operational Focus Model.
- **Project Tracking and Action Plan.:**
  - Context of the Organization- Project Plan Management.
  - Scope of Works.
  - Project Tracking- Gantt Chart.

A HIGH SCHOOL ACADEMY CONTEXT

A CENTRE WITHIN AN EXISTING HIGH SCHOOL THAT OFFERS ADVANCED TECHNICAL AND SPECIALIZED COURSES .

LIMITED RANGE OF SUBJECT OFFERINGS-"FOCUS SUBJECTS I.E., AVIATION STUDIES, AERONAUTIC ; SPACE SCIENCE

FUNDING – PARTNERSHIPS & EXTERNAL SUPPORT;

FACILITIES – TAILORED & APPROPRIATE IN-DEPTH TO THE FOCUS FIELD;

TEACHERS - SPECIALIZED SKILLS, KNOWLEDGE & EXPERIENCE;

LEARNER ENTRY - SELECTIVE WITH BROAD ACCESS BASE;

RESIDENTIAL FACILITIES; AND

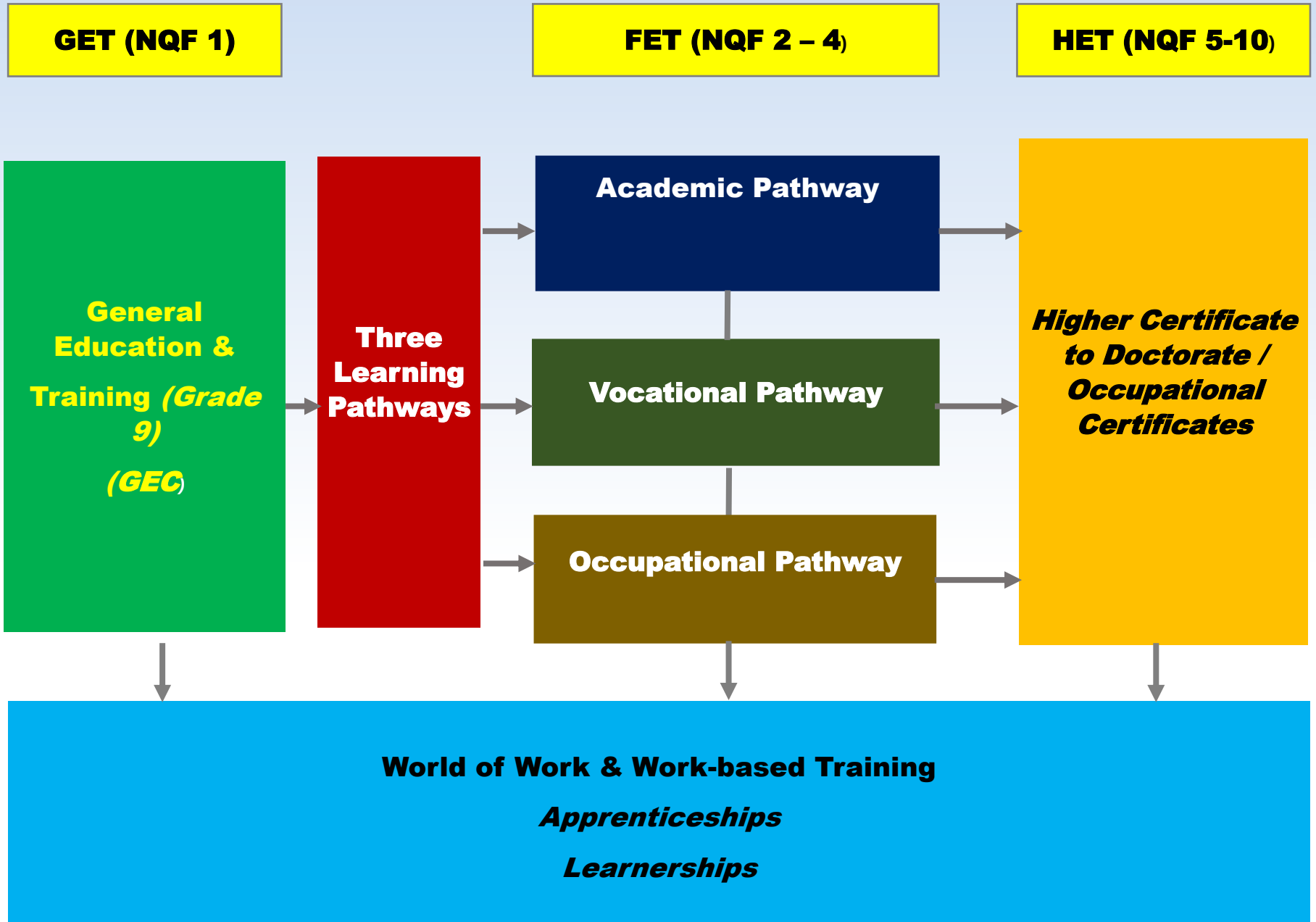
OFFER **MULTI-CERTIFICATION** PROGRAMS

DBE INTEGRATED NATIONAL MST STRATEGY (2019-2030)

The INMST Strategy aims to increase **learner participation** and improve **performance** of learners in Mathematics, Science, Engineering and Technology(STEM) subjects by:

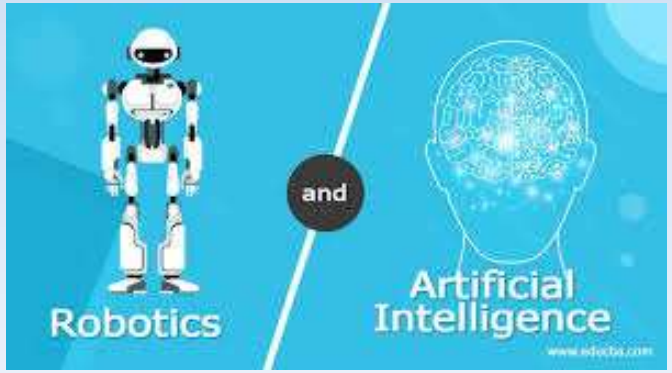
- Updating **Curriculum Content to** Enhance Innovation, Creativity and Implementation Methods in Response to Societal Needs;
- Developing Adequate Mechanisms to Respond to Teacher Demand, Supply, Utilisation, Development and Support;
- Providing **Appropriate Educational Materials** and **Training**;
- Provide a Project orientated Curriculum **Workbook** **Progress Assessment and Evaluation** Portfolio of Evidence(POE)
- Mobilizing **Partnerships** to Enhance Learning Outcomes.

THE THREE STREAMS



New Curriculum Introduced

Academic Stream

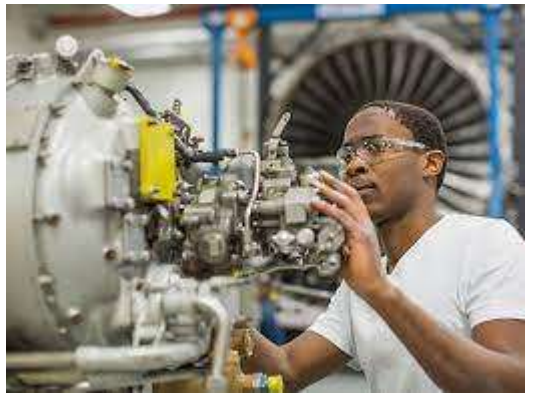


- Coding and Robotics
- Marine Sciences
- Aviation Studies

Vocational Specializations

- Technical Mathematics and Technical Science
- Engineering, Graphics and Design
- Civil, Electrical and Mechanical Technology – each with three sub-specializations

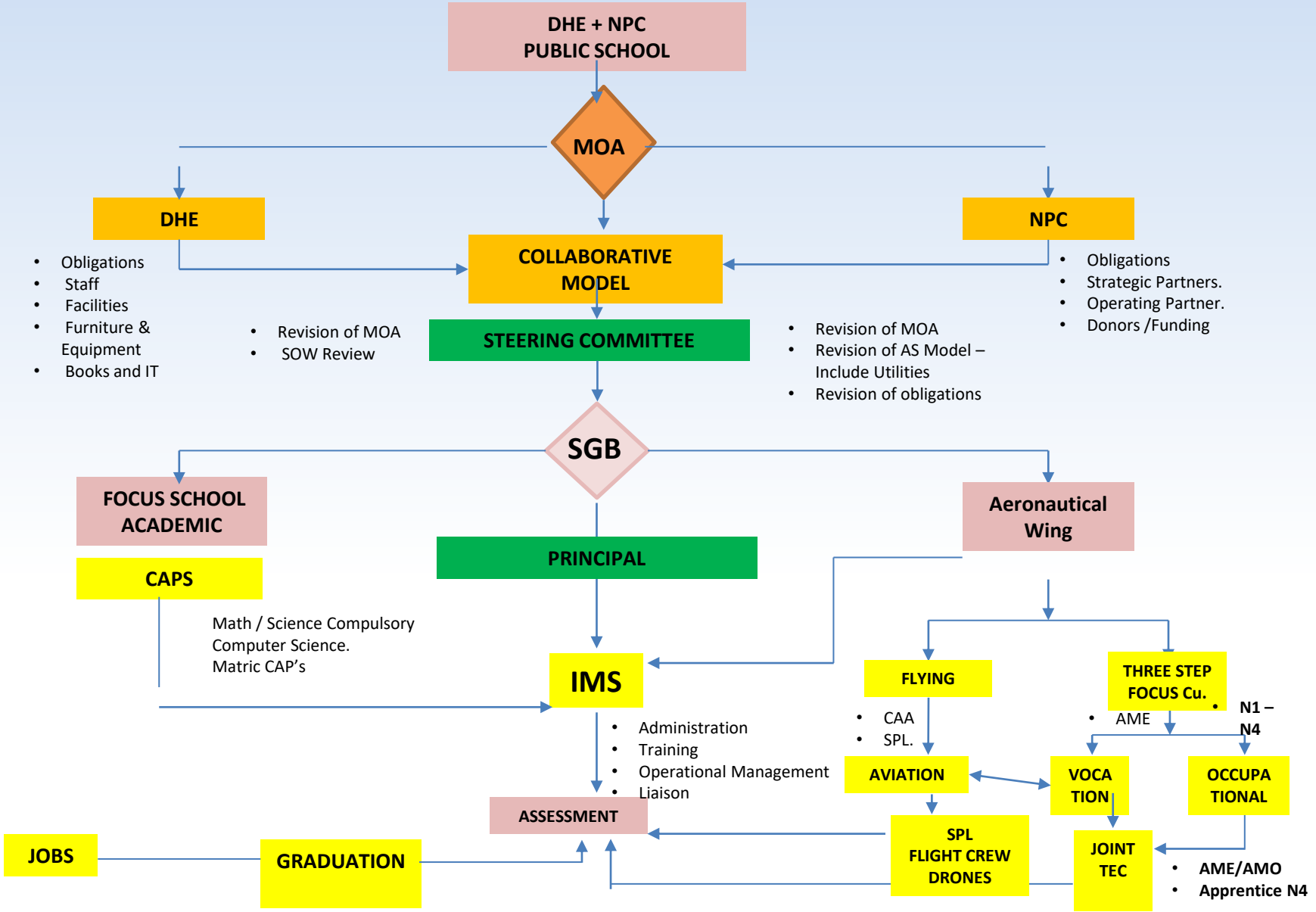
Occupational Specializations



- Occupational oriented Skills.
- Service Technology: AMM, AME, Airfield Maintenance.
- Mechanical: Motor Mechanic; Sheet Metal Worker.
- Electrician: Domestic; Air Conditioning; Refrigeration.

CO0PERATIVE PARTNERSHIP MODEL

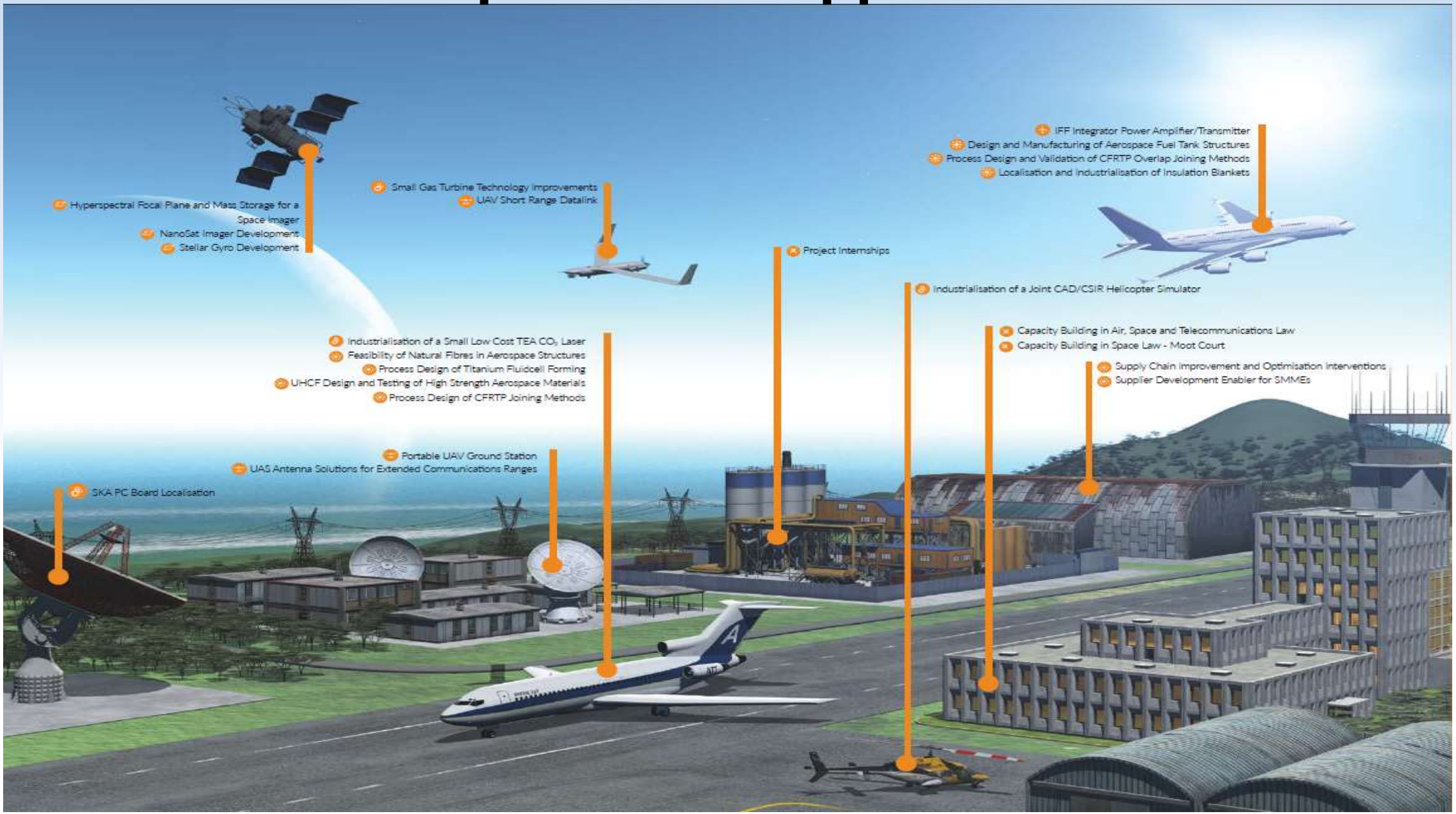
FOCUS HS FOR AEROSPACE SCIENCE



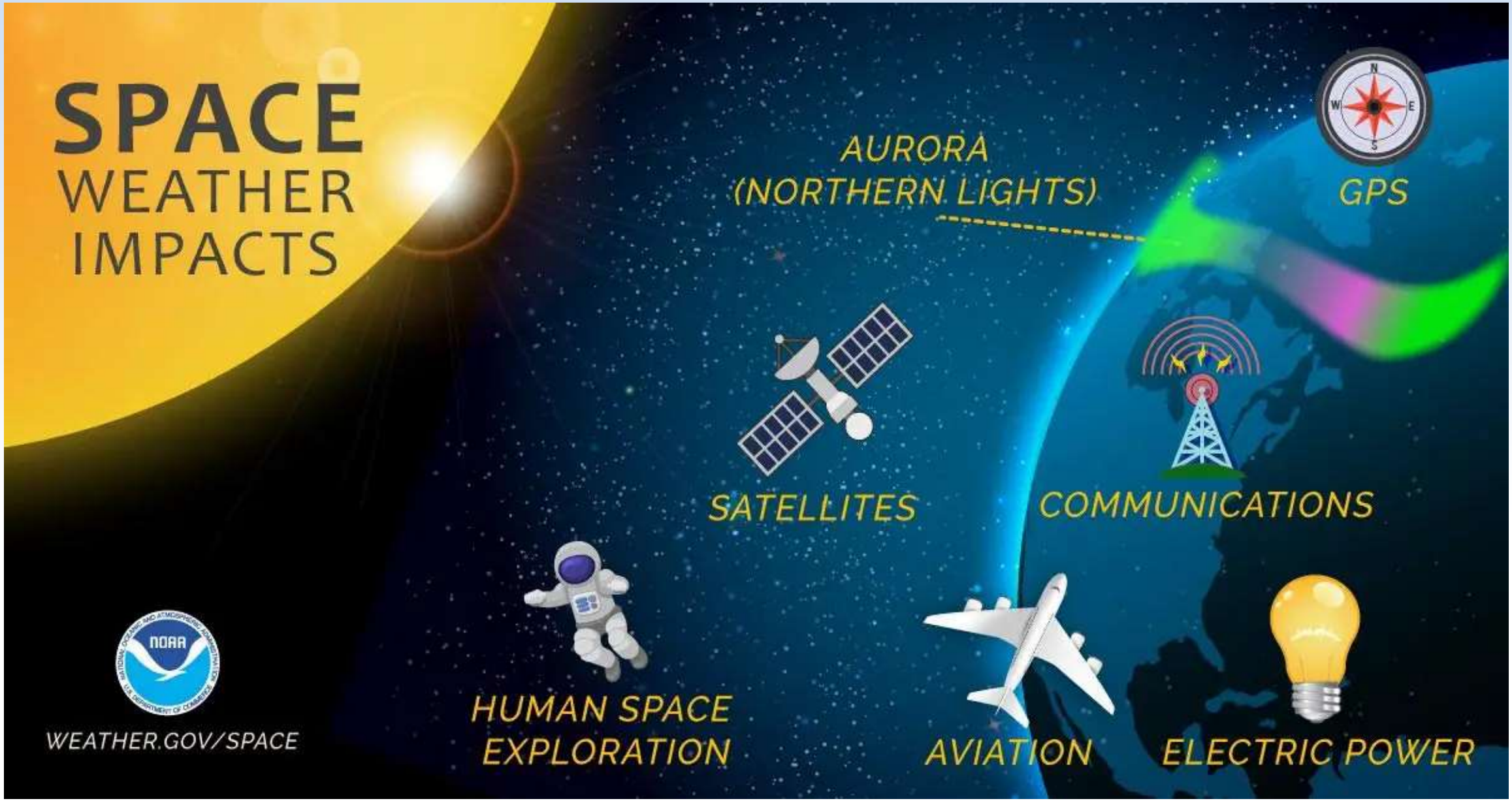
Motion Simulator Clip.

- https://youtube.com/watch?v=El3TDXQrV6U&feature=share

Aerospace JOB Opportunities



Space Science Career Opportunities



SKILLS DEVELOPMENT

- **Aviation Laboratories.**
  - -Using scientific equipment.
  - -Taking measurements.
  - -Carrying out specific procedures.

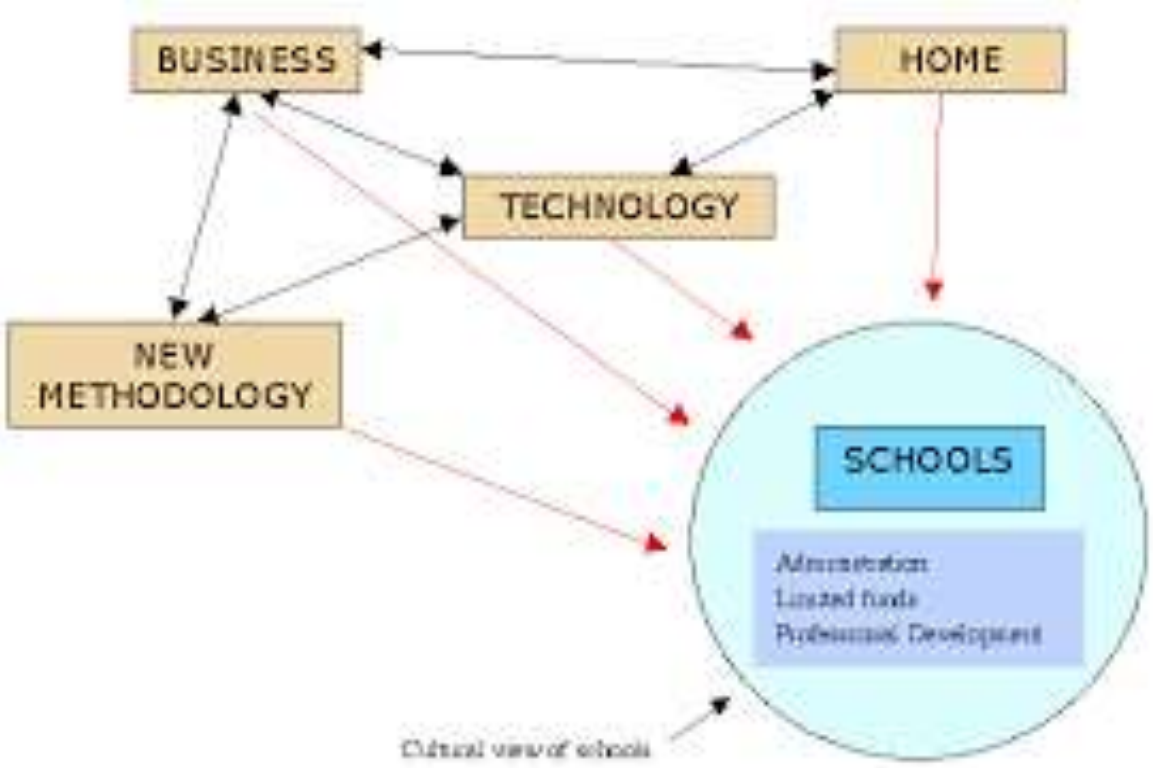
- **Aerospace Workshops.**
  - -Mechanical-Engines and Airframes.
  - -Electrical-AC/DC Systems-Generators/Batteries Alternators-Aircraft Wiring.
  - -Flight, Instruments/Pilots six-pack(speed,
  - -Climb/descent, attitude, heading, turn/Bank)
  - -Avionics-Radio/Radar(Weather and Navigation)

- **Museum Aerospace.**
  - -Restoration.
  - -Rehabilitation.
  - -Modelling.
  - -Re-Building of Aircraft Engines, Airframes et al.

SPECIALTY EDUCATION COMMON FEATURES

All include:

- A focus on **skills and knowledge.**
- **Application in the world of work.**
- Responsiveness to **marketplace/workforce needs.**



KEY RESOURCES

- To launch the project will require an investment into:
  - Property/Infrastructure-Airfield Hangar, Cape Metropol.
  - Services
  - Equipment
  - Logistics
  - HR
- Given the perceived time constraint barriers ,the Implementation has been planned in Five Phases:
  - **Phase 1: 2024**-Construction Phase 1 Campus..
    - Making use of Airfield Services.
    - Budget for Phase 2 requirements
  - **Phase 2: 2025-** School opening with 100 Grade 8 Learners.
  - **Phase 3: 2026-** Construction of Main School Campus.
  - **Phase 4: 2027-** Construction of Hostel, Outbuildings, Sports Fields
  - **Phase 5: 2027/8**- Construction of a Hangar for an Aerospace Museum for Apprentice Training(MAP).

Planned maximum school learner capacity 2029- 500 Learners.

COST STRUCTURE

ITEMS:i	UNITS	AMOUNT	COMMENTS
Operational Costs: **a. Airfield Campus** **b. Main Campus** **C. Boarding House**	1x Aircraft Hangar As per Architect Drawings As per Architect Drawings	R12.0 Million R80.0 Million R20.0 Million	ETR Jan 2025. ETR Sept 2025 ETR June 2026
Teaching Staff: **Principal.** **Educators**	Negotiable i. Aviation Studies. ii. Educators x 4	 R600Kp.a. R1532Kp.a.	Alternatives BSc Graduates-Contracts
Administrative Staff: **Clerk.** **IT Practitioner**	Negotiable		
NSNP: **50 Learners**	2 x 50 meals per day		Cafeteria available on site. Arrangements can be made to it budget.
Furniture: **a. Teachers Desks.** **b. Teachers Chairs.** **c. Learners Desks .** **d. Admin/Staff**	a. 1x 4 desks. b. 1x 4 chairs. c. 1x 50 desks. d. 2 x Table plus Chair		
Recreational// Sporting	TBA		SGB Function
Computers & Connectivity **i. Computers.** **ii. Conntivity**	1 x 54 plus license. LAN in FO.	R1,080,000	SGB Function.
Tools and Equipment:	As required i. Flight Bag and Kit. I x 10. ii. AMO Toolkit. 1x 30 iii. Astronomy 1x 10.	TBA	SGB Function.
Estimate Start-up Budget	**Forecast for FY 2025.**	**R 7.1Million**	**Collaborate Partnership**
Kitchen available			

Marketing

- Develop, produce and distribute a School Prospectus.
- **Identify Main decision makers, influencers and potential Partners.**
- Prepare a Project Plan(**Business Plan**) for Interested Parties(Buy-in).
- **Prepare a Promotional Plan for implementation**:
  - Presentation to School Principals and Staff.
  - National Schools Competition to prospect candidates for the school.
  - Road Show in key areas.
  - Boot Camp for 50 successful candidates- April 2024.
- **Manage and Analise results.**

VALUE PROPOSITIONS

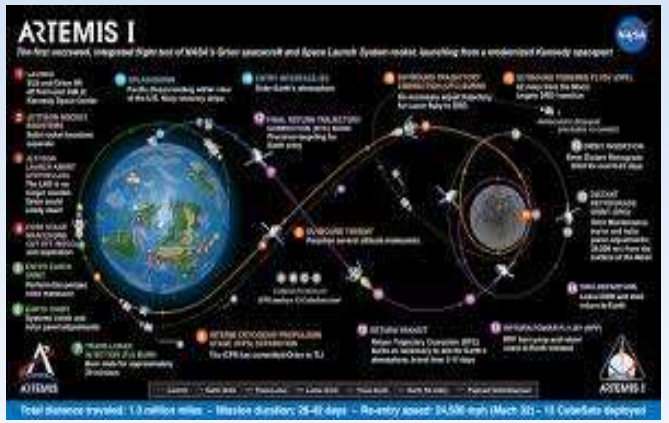
- The establishment of a new High School Academy in the area will **offer a package of products and services to the Western Cape Communities** that would meet some of their specific needs. These would include:
  - A High Technology Aerospace Science Educational Facility , in the “Heart of Academia” (Arguably the first of its kind in South Africa).
  - **A unique High School** which will meet the Aerospace requirements of the 4th Industrial Revolution.
  - **Learners Graduate with a Matric Bachelors plus an accredited Civil Aviation Certificate.**
  - A school which will deliver Leaders, Entrepreneurs and Aviation Practitioners to help mitigate the critical shortages in the Aerospace domain.

Meeting the Aerospace Industry’s future skills needs e.g., Pilots, ATC, Engineering, Technologists and Aviation Support- and Airport Services; Space Technologists.

Supporting Job Creation and Economic Development in the Precinct.

CONCLUSION

A New Space Order.



- The “Old Space” sent humans to the Moon.
- “ New Space” brings the beyond down to Earth, by way of the
  emergence of private and cheaper launches, human spaceflight, and
  growing use of small satellites and sensors for Communications, research etc.
- Industry needs to grow exponentially with the **new era aerospace demands.**
- For South Africa **to keep pace with its BRICS partners in the geopolitical rivalry for space independence,** she will need to **invest heavily in Aerospace Focus Youth Programmes without delay.**

Meeting the HR Challenges of the Future.

- Develop a Training Pipeline Program for Aerospace Studies to meet the 2030 HR and 4IR requirements.
- **Establish a High School Academy for Aerospace Science and Technologies** with Vocational and Occupational Oriented Curricula in Focus School(s), **to provide the emerging Aerospace Industry with suitably prepared Academy Graduates** for **immediate integration** into the Aerospace domain. Target **Date 2030.**