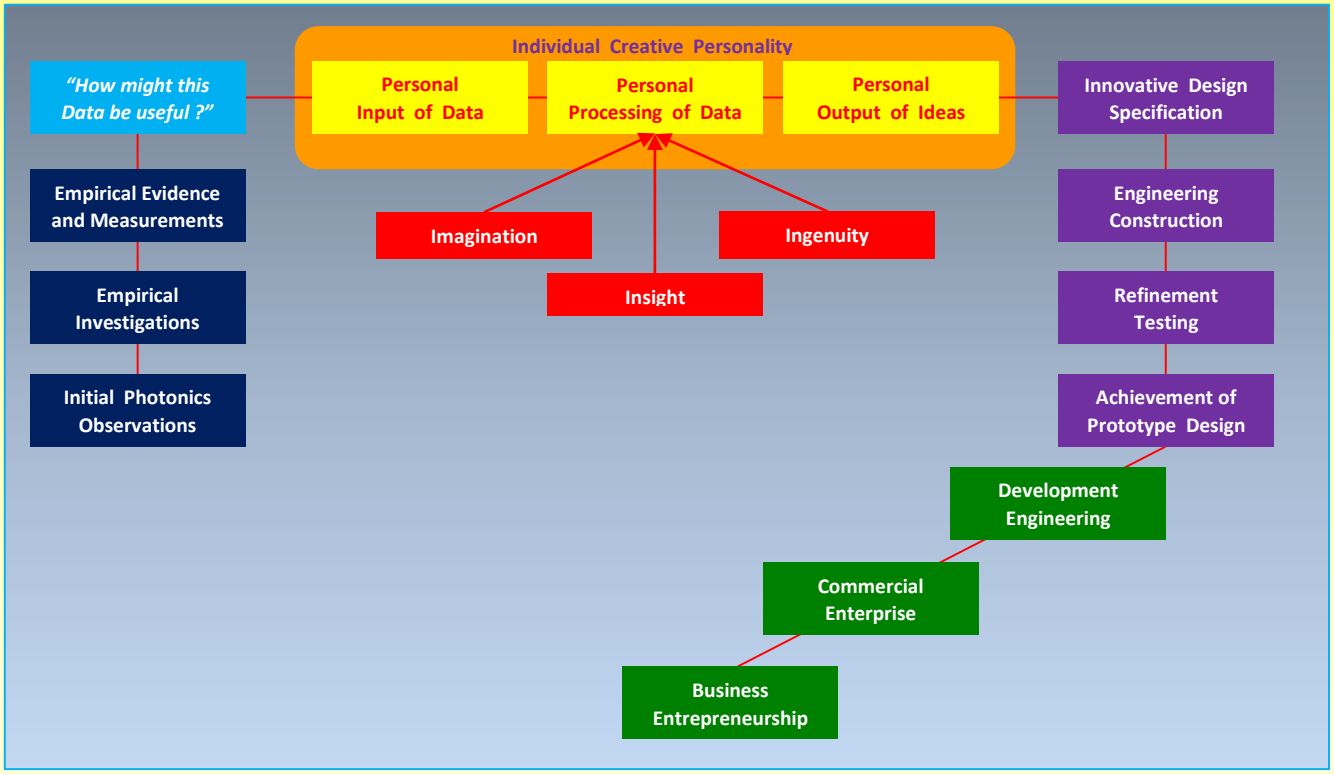
1.4 Designing with Light to reveal Imaginative Ingenuity and Insight

1.4.1 The PAWB Approach to Designing with Light

1 The PAWB procedure for innovative Designing in Light springs from a realistic encouragement for Individuals **to utilize new Photonics Information at the very instant that such Photonics Information is made available,** through the initial Observations, which are followed immediately by the Empirical Investigations, and the Individual's personal acquisition of Empirical Evidence.

2 This procedure can be represented by the following Flow Diagram:-



1.4.2 Designing with Light to Eliminate Ambient Light

The Major Complication with any Light Based Investigation is the presence of Ambient Light. There are several Optoelectronic / Mechanical techniques of "**Eliminating Ambient Light**", and these techniques need to be incorporated into any Design Specification for a Prototype Design Solution, as mentioned below:-

1 **Turn off the Lights !! Work in the dark !!**

2 **Work at Night to avoid Sun-light - or Wait for a solar eclipse !**

3 **Pulse the Laser / LED source at a particular frequency, and pass the signal to a Narrow Band-pass Frequency Filter.**

4 **Plane Polarize the Laser / LED beam source, and place similarly oriented polarizing filter in front of Photodiode.**

5 **"Hide" the Photodiode within a protective "tube collimated hat".**

6 **Collect the incoming signal via an optic fibre, and then place the Photodiodes in a light sealed box.**

7 **Apply the Photodiode signal to a Voltage Comparator which is set to give an output ONLY when the Laser / LED signal is Greater than / Less than a pre-set voltage signal.**

8 **Apply the signal to the Photodiode as an Infra-Red signal Laser beam / LEDs**

9 **Apply the signal to the Photodiode as an Ultra Violet signal Laser beam / LEDs.**

10 **Use coloured Laser / LEDs, and arrange (with appropriate filters) for the Photodiode to be colour selective sensitive.**

1.4.3 Designing with Light utilizing Optoelectronic Circuits

The useful Optoelectronic Circuits to be considered include:-

1. Photodiode with Direct / Capacitor Input to Variable Gain Operational Amplifier
2. Voltage Follower Buffer.
3. Voltage Comparator
4. Low Pass / High Pass / Narrow Band Pass Filters
5. Frequency-to-Voltage Converter
6. Single / Twin Astable Multivibrator
7. Wien Bridge Oscillator
8. Audio Amplifier
9. Monostable
10. R S Flip-Flop
11. D-Flip-Flop
12. Logic Control Systems
13. Pulse Width Modulation Motor Control – with Direction Control

1.4.4 Designing with Light utilizing Mechanical Components

The Mechanical Components to be considered include:-

1. Acrylic Mounts for all of the Optoelectronic Circuits.
2. Optical Base Board.
3. Lens and Mirror Mounts, with potential for Steering / Height adjustment for LASER / LED Beams.
4. Remote Sensing Mounts for Photodiodes.
5. Box Mounts for "hidden" Photodiodes.
6. Fibre Optic longitudinal fixtures, plus Fibre Optic end Mounting.
7. LASER / LED Mounting.
8. Anti-Vibration Foam Padding.
9. Card for Prototype Model Making

1.4.5 Designing with Light utilizing Tools

The Tools to be considered include:-

1. Wire Side Cutters.
2. Pliers.
3. Screw Driver.
4. Craft Knife.
5. Fibre Optic End Polishing Kit.
6. Soldering Station.
7. Continuity Checking Multimeter.
8. Oscilloscope.
9. Power Supply Unit / Batteries / Switches.
10. Grounding Lead