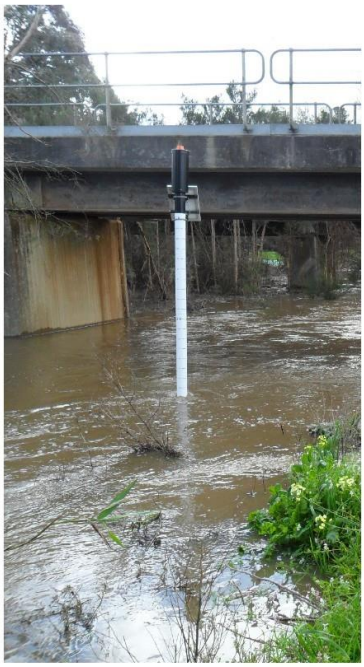
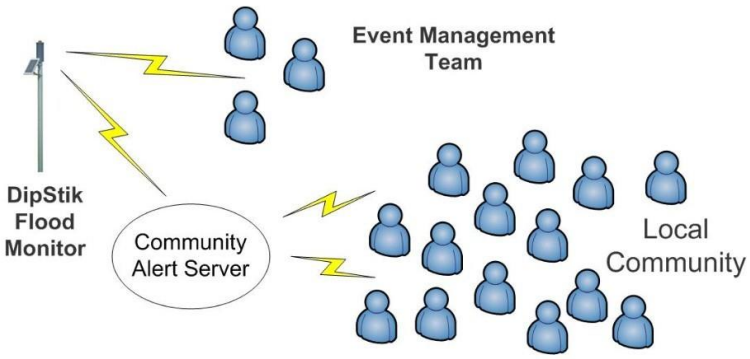
Tuftec Solutions – DipStik - Flood Warning Systems

July 2023



DipStik
Flood Warning Systems



Technology Solutions for Demanding Applications

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Tuftec designs, manufactures and supplies its own unique, cost effective, robust flood warning solutions called DipStik.

DipStik General Specifications

Dipstik is an innovative self-contained monitoring and alarm device designed to provide remote flood level alarm information via the mobile phone network using SMS or via web page access (flood image and data capture).

Flood alarm messages can be sent to anyone, located anywhere in the world that has mobile phone network or internet access.

Flood level detection is effected by hydrostatic pressure measurement within the controlled measuring/mounting tube. The standard product is configured for level measurements within the range of 0 – 3m with an effective measurement resolution of +/- 20mm.

DipStik is intended to be an economical, independent water level monitor and flood warning device for at risk flood prone areas such as business areas, community infrastructure, roadways, caravan parks, retirement communities, schools and small communities.

Water levels are sampled at 3 - 5 minute intervals (user configurable) to ensure that flood events can be detected and responded to promptly.

The standard metal mounting pole (3.25m high x 100mm diameter) doubles as the depth measurement tube. The mounting pole is vented top and bottom to enable the water to flow in and out of the measuring area. Custom mounting pole heights can be provided as a special order option.

The control/measuring module is mounted in a separate, removable enclosure at the top of the mounting/measuring pole.

The control module incorporates a custom, low power, highly integrated computing unit that controls all measurement and communications functions (data communications modem, measurement sensor, radio antenna, power supply and rechargeable battery).

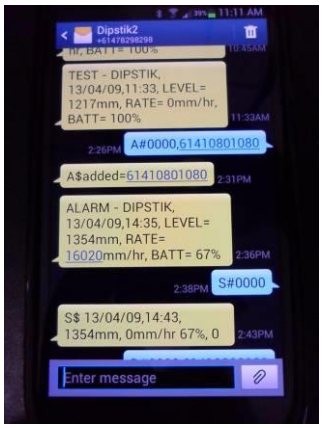
Power is provided from a solar panel mounted to the upper portion of the mounting pole which continually "tops up" the rechargeable batteries, enabling the product to operate 24x7. The charging circuit has been optimized to allow the batteries to fully recharge over several hours, even on overcast days.

The mounting pole is secured to an appropriate ground pinned (or optional concrete) footing via a sturdy 160 x 160 mm hinged, slip joint, mounting plate (10mm thick) fixed with 4 x M20 anchor bolts. The mounting plate is welded to the base of the mounting pole to ensure reliable, secure fixing.

The hinge mechanism, allows the entire assembly to be simply tipped over without the need for ladders, boom lifts or other aides. Thereby minimizing potential OHS issues during installation/servicing.

Field installation is achieved by fixing DipStik to an appropriate, sturdy mounting base. A unique "concrete free" mounting sub-base arrangement is available for ease of installation in almost any location.

DipStik requires no external power or communications connections making it ideal for remote locations. Typical site preparation, installation and commissioning can be achieved in a few hours (including installation of the footing/sub base).



Data and control messages can be sent remotely via SMS. There is no requirement for sophisticated backend data infrastructure to communicate with and manage the unit. The unit can be managed from any mobile phone or internet connected computer (with access to an SMS messaging service).

The key product features include:

- Low power microcontroller based recording, control and communication module
- 4G cellular network data communications
- SMS alarm messages can be pre-programmed to be sent directly to multiple destination phone numbers (up to 10 recipients)
- Programmable water levels for alarm output (100 – 3000mm)
- Programmable rate of rise alarm levels (10 – 9999mm/hr), for early warning of potential severe flood conditions
- Programmable periodic (weekly) test/heart-beat message generation (to provide confidence of on-going device operation)
- Optional bulk SMS alarm messages to multiple recipients (via SMS Gateway option). Ideal for direct alerts to small communities, holiday parks and retirement villages.
- All features/alarm trigger levels are configurable

remotely via simple password protected SMS messages. Costly backend data servers and management systems are not needed for simple DipStik installations.

- Programmable “End of Flood” event level, to enable management/maintenance staff to be advised when conditions are once again safe and flood protection measures can be decommission (eg removal of flood warning signs/barriers)
- Password protected and “registered sender” data communications security features
- Solar power supply system (capable of charging in low light levels)
- Reliable hydrostatic, micro bubbler, water level sensing system within the mounting pole (up to 3m depth)
- Simple debris filter to water inlet at base of measurement chamber to ensure reliable operation
- Strong, corrosion resistant mounting pole for general environment and vandalism protection
- Air vent at top of pole (below electronics module) to enable unimpeded water level movement within the measuring area
- Alarm messages can be sent to multiple recipients and repeated multiple times (up to 9) to ensure that appropriate personnel and important customers are notified of events as soon as possible
- Internal ¼ wave whip antenna for reliable mobile network communications
- Alarm messages can be programmed to continue to be sent periodically (eg every 15 minutes), along with current flood data, while an alarm condition persists. This helps avoid situations where increasing event severity situations are accidently ignored
- Minimal maintenance requirements and high reliability as a result of the highly integrated electronics design, low component count, low power design and positioning of all sensitive components above the flood height (at the top of the assembly)
- Simple ground level maintenance and servicing provided by the hinged mounting base
- Optional flashing light beacon to warn the local community of flood hazards.

- The warning beacon activation water level is separately programmable from other alarm points
- Instant water levels (within the programmed sampling period) can be obtained in response to a simple SMS status request message
- Optional connection of 2 x float level sensors
- Top mounted electronics module includes:
    - Integrated electronics control board for low power operation and high reliability
    - Low power compact, multi band, 4G modem
    - Integrated solar charge controller
    - Rechargeable battery
    - Cellular network antenna, hidden under anti-tamper cover at the top of the unit
    - Hydrostatic micro-bubbler water level sensor
- Simple installation. No special tools or skills required in many instances. (Note: the concrete fee footing requires a jack hammer for installation)

- Optional tipping bucket rain gain to record local rainfall conditions. Alarms can be set to trigger when rainfall exceeds a programmable, preset rate. Maximum hourly, daily, weekly and 30 day rainfall statistics can also be maintained by DipStik to assist with flood event analysis.

- Optional “cloud” / remote data base logging feature for infinite data gathering capabilities.

DipStik-V Enhanced Specifications

Digital Camera

Each DipStik-V unit is installed with a weather proof digital camera. The camera is configured to take snapshots of the area surrounding the unit at regular intervals (typically every 4 hours or so) and post these to an internet cloud location (www.dipstik.info).

The latest captured image is available for viewing by anyone, anywhere, using a generic internet browser on any internet connected device (PC, tablet, Smart phone, etc).

During a flood event, the DipStik will also post an image at the time of an alarm condition and will increase the frequency of the automatic image capture process (typically to every ½ hour). A manager of the system can also force an image to be captured within minutes by sending a simple SMS command to the DipStik unit.

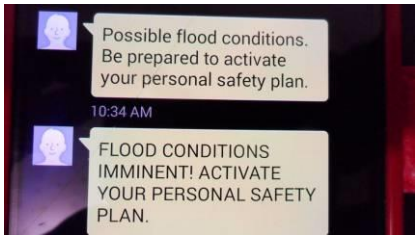
The Digital Camera incorporates a low light operating mode with Infra-Red assist illumination to improve overcast/night-time image capture.

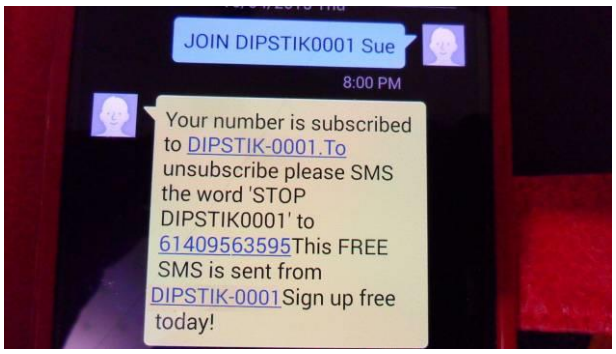
All captured images are overlaid with simple text messages that provide easy site identification, date/time of image capture and basic flood details (water height, rate of rise and rainfall rate [where rain gauge option is installed])

Community SMS messaging

Additional to the standard SMS communication employed in all DipStik models, it is possible to configure the system to broadcast special text messages to a wider community group using an optional SMS gateway service.

Using the SMS Gateway service, a DipStik installation can send flood alert information messages to as many as several hundred recipients within minutes of a flood event being detected.



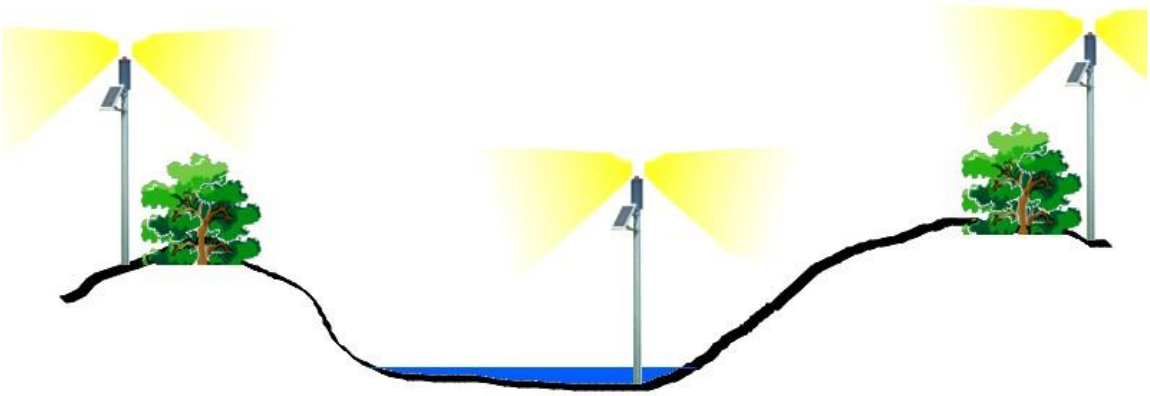


The SMS Gateway facility enables potential users to self register (and deregister), using their own mobile phone, to receive alert messages from the system, thereby simplifying the management of broadcast message dissemination.

This feature is particularly suited when direct flood alerts need to be sent to community groups within tourist parks, retirement communities and small townships.

Warning Message Relay

In situations where multiple DipStik units are installed in an area (such as on a stretch of roadway), the units can be configured to share warning information.



When a DipStik unit detects a flood situation and activates its warning light, it can also notify other Dipstik units so that they also activate their warning lights or activate other connected devices such as boom gates, Wig-Wag signage and variable message signs.

This is a particularly useful feature for providing protection of an extended section of road or pathway that might be prone to flooding in a central location. By activation of the warning lights, ahead of the actual flood conditions, individuals can decide to take an alternative route to avoid the hazard.

The communication distance between units is only limited by mobile network coverage.

Rain Fall Measurement/Alarm

An optional Tipping Bucket Rain Gauge can be installed on the top of the DipStik unit (a number of different sizes are available). This enables the measurement of local rainfall trigger points to be factored into the logic that determines whether flood conditions are likely.

Rainfall precipitation rate trigger points can be programmed into the DipStik unit so that it can signal an early alert message for a potential flood situation.

Daily and Monthly rain fall statistics are maintained within the unit and can be extracted using simple SMS commands.

DipStik also records absolute maximum rainfall levels (daily and monthly) for post flood investigation and flood mitigation planning.

Remote Software Update

DipStik units incorporate the capability to automatically detect, download and install new software updates, without the need for a technician to attend the site.

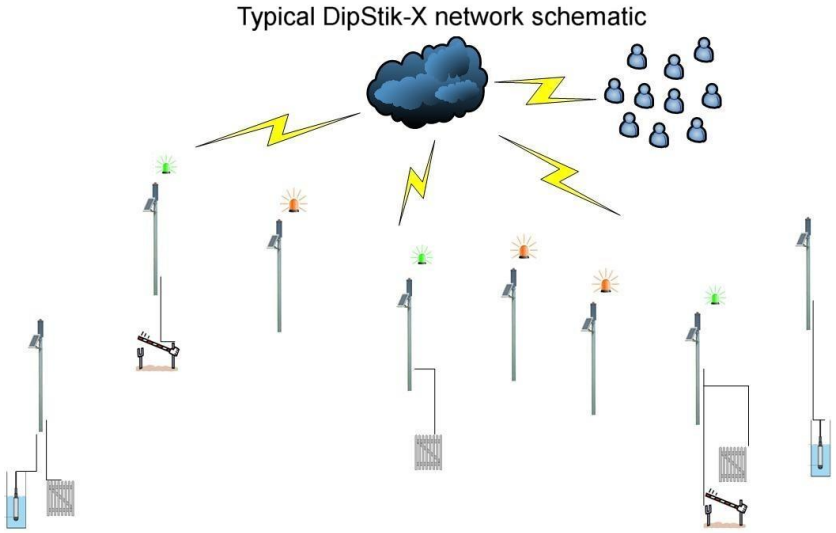
This feature reduces the costs associated with the rectification of simple system operating issues and enables new features to be rolled out more rapidly and at reduced cost to equipment owners.

It also provides scope to cost effectively customize particular DipStik installations to suit local client/community requirements.

DipStik-XR Flood gate control Specifications

DipStik-XR units incorporate additional, low power device interface logic and extended battery capabilities to enable local control of flood activated boom gates and emergency exit/egress gates.

The DipSik-XR family of units also incorporate additional networking capabilities, enabling the implementation of a distributed flood warning system with up to 16 separate DipStik units.
These DipStik units can be spread apart by only a few hundred metres or many kilometres. All units share information wirelessly and jointly provide autonomous, warning information and access control facilities to protect larger open areas such as pathways, bicycle tracks, roadways and public facilities.



In keeping with the DipStik ease of installation and cost minimisation philosophy, all DipStik-XR systems are self powered and utilise wireless data communications technologies. There is no need to run expensive power and communications cables over long distances.

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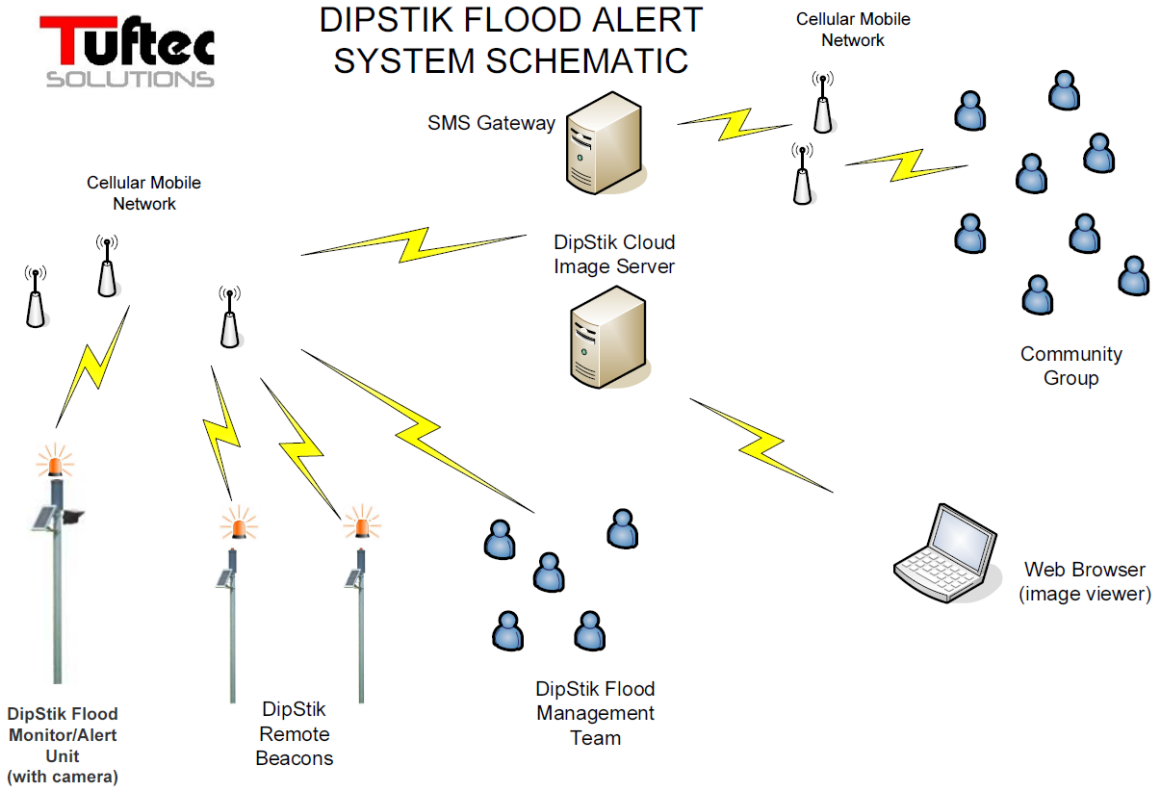

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