WHAT IS CLAIMED IS:

1. A wellsite system comprising:

a control workstation;

a fluid pump unit comprising a first rotary actuator and first sensors, wherein the first sensors generate data indicative of surface fluid flow rate, surface fluid pressure, and surface fluid temperature;

a conveyance device comprising a conveyance line, a second rotary actuator, and second sensors, wherein the second sensors generate data indicative of surface depth of a tool string within a wellbore, surface conveyance speed of the tool string within the wellbore, and surface line tension of the conveyance line;

the tool string conveyed and comprising third sensors generate data indicative of downhole operational parameters of the tool string and environmental parameters affecting the tool string within the wellbore, wherein the third sensors include:

a downhole tension sensor generating data indicative of tension experienced by the tool string;

a temperature sensor generating data indicative of ambient temperature of fluid surrounding the tool string within the wellbore;

a pressure sensor generating data indicative of downhole pressure of the fluid surrounding the tool string within the wellbore;

a depth sensor generating data indicative of depth of the tool string within the wellbore; and

a speed sensor generating data indicative of downhole conveyance speed of the tool string within the wellbore; and

a processing device communicatively connected with the first and second rotary actuators, the conveyance device, the tool string, and the first, second, and third sensors, wherein the processing device:

receives target values of operational parameters entered into the processing device by a wellsite operator via the control workstation, wherein the target values include:

a target depth of the tool string within the wellbore;

a target conveyance speed of the tool string within the wellbore;

a target fluid flow rate output by the fluid pump unit into the wellbore;
a target conveyance line tension; and
a maximum conveyance line tension threshold;

receives physical characteristics of the wellsite system entered into the processing device by the wellsite operator via the control workstation, wherein the physical characteristics include:
mass of the tool string;
a coefficient of friction of the tool string against passing fluid;
elasticity of the conveyance line;
mass per unit length of the conveyance line;
density of the fluid being pumped by the fluid pump unit;
viscosity of the fluid being pumped by the fluid pump unit;
physical parameters of the wellbore; and
a coefficient of friction of a casing of the wellbore against the tool string and passing fluid; and

controls conveyance of the tool string within the wellbore via cooperative control of the fluid pump unit and the conveyance device based on:
each measurement from the first, second, and third sensors;
each target value; and
each physical characteristic of the wellsite system.

2. The wellsite system of claim 1 wherein the downhole tension sensor comprises a load cell.

3. The wellsite system of claim 1 wherein the target conveyance line tension is a target surface conveyance line tension.

4. The wellsite system of claim 1 wherein the target conveyance line tension is a target downhole conveyance line tension.

5. The wellsite system of claim 1 wherein the maximum conveyance line tension threshold is a maximum surface conveyance line tension threshold.

6. The wellsite system of claim 1 wherein the maximum conveyance line tension threshold is a maximum downhole conveyance line tension threshold.

7. The wellsite system of claim 1 wherein the target conveyance speed of the tool string is selected to automatically vary along different portions of the wellbore based on the physical parameters of the wellbore.

8. The wellsite system of claim 1 wherein the target conveyance line tension is a target surface conveyance line tension.

9. The wellsite system of claim 8 wherein the maximum conveyance line tension threshold is a maximum surface conveyance line tension threshold.

10. The wellsite system of claim 9 wherein the target conveyance speed of the tool string is selected to automatically vary along different portions of the wellbore based on the physical parameters of the wellbore.

11. The wellsite system of claim 1 wherein the target conveyance line tension is a target downhole conveyance line tension.

12. The wellsite system of claim 11 wherein the maximum conveyance line tension threshold is a maximum downhole conveyance line tension threshold.

13. The wellsite system of claim 12 wherein the target conveyance speed of the tool string is selected to automatically vary along different portions of the wellbore based on the physical parameters of the wellbore.